Third Holcim Awards

SUSTAINABLE CONSTRUCTION
2011/2012
Regional and global Holcim Awards competitions for sustainable construction projects and visions 2011/2012
Third Holcim Awards
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The Holcim Foundation sees itself more and more as a network-platform for sharing information. We want to promote the exchange of knowledge and experience. And we want to support the cross-border multiplication of outstanding and innovative examples of sustainable construction – including the many prize-winning ideas presented in this publication.

As a leading global provider of building materials, Holcim shares responsibility for the future of our planet and society. That is why the Holcim Group produces building materials as sustainably as possible in around 70 countries in which it is present. The Group has been committed to the sustainable application of its products for many years, and in 2010/11 Holcim was confirmed for the ninth year running as a member of the Dow Jones Sustainability World Index for the building materials industry.

Holcim is celebrating its centennial in 2012. At this milestone anniversary, the Group shows itself to be solidly anchored and operating responsibly. A great level of gratitude for this achievement is acknowledged to Markus Akermann, who recently passed on the leadership of Holcim to Bernard Fontana. Markus Akermann’s influence decisively shaped the company he joined in 1978. Among the considerable achievements of Markus Akermann are that he made possible the creation of the Holcim Foundation for Sustainable Construction in 2003 and that he guided and supported the Foundation as Chairman of the Management Board until his retirement.

The Holcim Foundation has aimed to build awareness of the importance of sustainable construction among professionals and the public. Supported by a global network of technical universities, architects, engineers and professionals from related disciplines, the Holcim Foundation seeks to globally interlink knowledge and to promote a mindset that views sustainability not only in terms of the immense technical challenges but also in terms of architectural excellence and heightened quality of life.

A focus of the organization’s initiatives – and the activity with the greatest public impact – is the global Holcim Awards program. The Holcim Foundation conducts this international competition for projects and visionary ideas in sustainable construction every three years. The prize money totals USD 2 million per cycle. Each time the competition is held, it attracts an increasing number of participants from around the world.

Conveying innovation worldwide

By Rolf Soiron, Chairman of the Board of the Holcim Foundation and of the Board of Directors of Holcim Ltd, and Bernard Fontana, Chairman of the Steering Committee of the Holcim Foundation and CEO of Holcim Ltd

“The Holcim Awards are an enormous opportunity for professionals and students to gain visibility.”

Rolf Soiron, Chairman, Holcim
around the world. In 2011 over 6,000 projects were entered. 2,251 projects from 126 countries fulfilled all the criteria; they were assessed by one of the independent juries that convened in five world regions, hosted by the respective partner university of the Foundation. In each region, a Holcim Awards Gold, Silver and Bronze for 2011 were conferred — and additional projects received prizes in the Acknowledgement and “Next Generation” categories. The 15 regional Award winning projects were then assessed further by a global jury, which selected the winners of the Global Holcim Awards Gold, Silver and Bronze for 2012. In this cycle, three Global Holcim Innovation prizes are being conferred for the first time — to reward developments in innovative building materials and construction technologies in the context of sustainable construction. Competing in this new category were all 53 projects that had earned a prize at the regional level. All these outstanding concepts, projects and ideas have been collected into this book, which offers quite an impressive overview.

Not only has the Holcim Foundation consolidated its notoriety, the organization has evolved. The former advisory and management committees have been merged into a single Board, comprising the following members:

**Alexander Biner**, Partner, MS Management Service, Switzerland  
**Bernard Fontana**, CEO, Holcim, Switzerland  
**Harry Gugger**, Principal, Harry Gugger Studio; Professor of Architecture, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland  
**Yolanda Kakabadse**, President, WWF; Chair of the Advisory Board of Fundación Futuro Latinoamericano, Ecuador  
**Enrique Norten**, Principal and Founder, TEN Arquitectos, Mexico/USA  
**Hans-Rudolf Schalcher**, Prof. em. of Planning and Management in Construction, Swiss Federal Institute of Technology (ETH Zurich), Switzerland  
**Rolf Soiron**, Chairman, Holcim, Switzerland  
**Klaus Töpfer**, former Executive Director of the United Nations Environment Programme; former German environment minister, Germany  
**Simon Upton**, Director of the OECD Environment Directorate; former New Zealand Minister for the Environment, France/New Zealand  
**Roland Walker** (Delegate), Head of Corporate Communications, Holcim, Switzerland

We sincerely thank these strong supporters of the Foundation and of sustainable construction for their great commitment, technical knowledge, and their important personal views.

Holcim is an internationally active Group in which technical and commercial knowledge is exchanged between continents. Nevertheless, our core business is geographically anchored. It is based on natural raw materials and creates end products that are sourced, processed, delivered and utilized, rarely at great distances from their origin. In contrast, the Holcim Foundation is based on conveying innovative concepts and practices on an international basis: through the international Holcim Forums and the Holcim Awards, it disseminates the ideas and achievements of architects, planners and engineers around the globe — to the benefit of humanity and the planet.

As a construction materials manufacturer — a position that carries as much responsibility as privilege — Holcim stands at the start of a value creation chain. With innovative products, services and processes, and with the support of the Holcim Foundation, we will continue to strive for sustainable practices in the construction industry around the world — because sustainable construction is essential for everyone.

“Sustainable construction is a blend of creativity, entrepreneurship, leadership, and innovation.”  
**Bernard Fontana, CEO, Holcim**
Global Holcim Awards jury
Zurich, Switzerland, March 15, 2012

1. Rolf Soiron, administrator, Switzerland
2. Mario Botta, architect, Switzerland
3. Maria Atkinson, administrator, Australia
4. Yolanda Kakabadse, administrator, Ecuador
5. Werner Sobek, civil engineer, Germany
6. Julia Marton-Lefèvre, administrator, France/Switzerland
7. Aaron Betsky, architect/critic, USA
8. Enrique Norten, architect, Mexico/USA
   (Head of the jury)
9. Hans-Rudolf Schalcher, civil engineer, Switzerland
10. Rahul Mehrotra, architect, India
“For all of us who are involved in the world of architecture and design, sustainable construction is a very important responsibility.”

Enrique Norten, Head Global Holcim Awards jury 2012
Sun, wind and water

At the age of 18, Francis Kéré moved from Burkina Faso to Berlin to study architecture. Today he commutes between two worlds: his original home in Africa and his new home in Europe. As a bridge builder between the two cultures, he has spent more than a decade cultivating an awareness of the value of education in his native village where, in collaboration with the local community, he has been the driving force behind a school complex.
Global Holcim Awards Gold 2012

Some of the projects awarded prizes in the Holcim Awards competition are organized by public authorities. Others are initiatives of imaginative teams. And yet others are the inspiration of a single person – like the Global Holcim Awards Gold 2012 winning project. Without Diébédo Francis Kéré, born in 1965, the prizewinning school complex in Burkina Faso would not exist. Although the project is the result of the efforts of many people – and Francis Kéré not a person to hog the limelight – one point is undisputed: he is the father of the school in Gando. And like a good father, he works passionately to ensure that his child flourishes, grows bigger, and will one day be independent.

Headman’s son without privileges

Francis Kéré’s homeland Burkina Faso in West Africa is located in a very hot part of the southern Sahel zone. The country is one of the poorest in the world, but politically stable. Three quarters of its 17 million inhabitants live in rural areas. Francis Kéré, too, is one of this majority, the eldest son of the headman of Gando, a village about 200 kilometers south of the capital Ouagadougou. The fact that his father was the headman does not mean that he was privileged, the architect emphasizes. “On the contrary, it is a heavy burden to be the headman’s son. This duty no longer has any formal power, nor does it generate income.” Francis was sent to school so that at least one person in the family would be able to read and write; up until then any letters that his father received had to be read out aloud by a government official. The decision to send him to school was an enormous step. In Burkina Faso even primary education cannot be taken for granted. Because many children have to work in the fields, they do not attend school, the outcome of which is that only one in four adults in Burkina Faso is literate. Francis made the best of the opportunity offered him. He was such a good pupil that he was selected for a vocational school in the provincial capital. After training as a carpenter and joiner he set out for the capital to look for a job. “There,” he tells us, “I learned that Germany was offering a university scholarship. I applied – and got it!” At the time he had just turned 18 and did not speak a word of German. “It was simply mindboggling. To start with, the flight taking me away from my country was an unforgettable experience: looking down I saw the world get greener and greener, and suddenly there was this huge stretch of water – utterly inconceivable to me.”

Help for self-help

According to African tradition, each person has to care for other members of his family – and of his community, too. Kéré explains: “If a person leaves his community to seek a better life, he tries to make up for the gap he leaves by providing financial support.” So it is expected of someone like himself that he will make a contribution to improve living conditions in the village. “Anyone in my position would act in the same way. I wanted to help to develop my village. But I wanted to offer the community more than just money.”

“I wanted to help to develop my village. But I wanted to offer the community more than just money.” Francis Kéré
“That is what motivated me to establish a good school in my village that would be attended by as many children as possible. This would be flanked by smaller development projects to help the standard of living in other ways.” It was clear to him from the start that in the long term all projects would have to be run by the village itself, hence his insistence on “help for self-help.” “I have nothing against giving hungry people a meal and food aid,” he says. “Indeed, after a natural catastrophe it is our duty to help victims to survive. But in the case of honest, sustainable development aid other considerations have to take precedence. We have to try to teach people to fish rather than always give them fish.”

Acolades galore
The architect knew that the old school in Gando had been severely neglected and was in danger of collapsing, and he wanted to replace it with a new building. He took the most direct route to fund his project: as architecture student at the Technische Universität Berlin, he persuaded his fellow students to give up a few cigarettes and use the money saved to buy one or two symbolic bricks for the school, in other words to donate a few coins for Gando. The campaign was a great success; you believe Kéré immediately when he states quite matter-of-factly: “I can mobilize and inspire people.”

In 1998 he and friends founded an association, Schulbausteine für Gando (Bricks for the Gando School), which took charge of the project’s funding. The new building, which cost about EUR 30,000, was opened in 2001.

Francis Kéré was guided by the principles of sustainable development and local traditions and materials. Thanks to thick earth walls, ventilation openings, and a roof with a large overhang, the primary school building has a pleasant ambient climate. The government provided teachers, the school filled with children immediately – and suddenly everybody was talking about it. In 2004 it received the Aga Khan Award for Architecture, the most important architecture prize in the Islamic world. This was followed in 2007 by the Zumtobel Award for Sustainable Architecture, in 2009 by the Global Award for Sustainable Architecture, and in 2010 by the BSI Swiss Architectural Award. Despite all this recognition, Kéré has not rested on his laurels – on the contrary. In 2007, the teachers’ accommodation building in Gando was completed, and in 2008 the ventilation system is as simple as it is ingenious: the hot wind is cooled in the moist, shaded mound, before flowing through underground pipes into the classroom. The expansion of hot air in the space between the ceiling and roof draws in the cool air.

Irrigating the mango trees: clay vessels filled with water stand next to the plants, each with a small hole in the base, through which as much water as the plant needs constantly seeps. The containers are filled by the pupils and teachers once a week.

“The women produce the traditional earth floor, the men press the earth bricks for the walls.” Francis Kéré
“What we are doing here is more than just architecture or development aid.” Francis Kéré
the extension to the primary school. At present a public library and a women’s center are under construction.

**Earth is good**

Francis Kéré applies fundamental principles of sustainable development in all his projects in Gando. The village community is heavily involved in the development process and in the construction work. As a result, the inhabitants quickly identify with the project – and learn new skills on the job. “Earth is often regarded as a building material for poor people,” the architect comments, “which is why people prefer expensive imported building materials that are then often used utterly wrongly.” By enhancing the earth and providing solid, constructive solutions, Kéré wants to raise acceptance of the free and inexhaustible natural building material. The Gando school project trains young people. They learn how to make bricks and how to work with modern building materials such as cement. Their training may also help them find work in the village, which will slow emigration and secure Gando’s future. “What we are doing here is more than just architecture or development aid,” Francis Kéré states. “It is a compelling social event. While the women produce the traditional earth floor, the men press the earth bricks for the walls, sweep the gravel, and collect natural stones for the foundation.” All of them want to work on the building, and usually there are far more volunteers than needed. As payment, workers receive a meal at midday – “And suddenly there was not enough rice and beans.” Long ago the village community decided their school would also be their community center, where meetings take place and vaccination programs are carried out.

**A commuter between two worlds**

Owing to the diverse projects in Gando, Francis Kéré is a famous man in Burkina Faso. More and more people approach him with their concerns in the hope that he can help them. These expectations put a certain pressure on him. But he himself also puts pressure on others. “Communities are demanding that many people now living in towns and cities should also act like this person in Gando.” Francis Kéré’s enthusiasm is infectious. He finds “life as an architect very tough.” On occasion he flies to Burkina Faso three times a month on account of the projects. Until recently he was an assistant at the Technische Universität Berlin as he was not sure whether he could survive on his income as a freelance architect. In the meantime, he is completely self-employed. At present he is designing part of the Museum of the International Red Cross in Geneva. A high-profile initiative is Operndorf Afrika, the opera village in Burkina Faso that he and the late German director Christoph Schlingensief initiated. “But 80 percent of my work is socially oriented, a lot of the projects I do I can barely live on. But I must add: what I get back from people, you can’t put that in words.”

**The journey goes on**

For that reason he continues to work tirelessly on his complex in Gando. “At the beginning I just wanted to build a tiny primary school; but you only live once. And who gets the opportunity to design his environment in the way that I can now in Gando?” Because of the importance attached to literacy in Burkina Faso, many primary schools were built – and secondary education was largely forgotten. Many young people have received only a primary school education and are not qualified for skilled occupations. “But a country needs good technicians; a primary school education is not enough,” Kéré remarks. So he is now building a secondary school in Gando. For his design he won the Holcim Awards Gold 2011 Africa Middle East and the Global Holcim Awards Gold 2012. In size alone the project eclipses everything that has been built in Gando. Covering 3,800 m², the new school is 12 times as big as the primary school opened in 2001 – and at EUR 200,000 costs almost seven times as much. Its 12 classrooms in five buildings around a central courtyard can accommodate 600 students from the wider community. In the extension to the primary school. At present a public library and a women’s center are under construction.

**The importance of agriculture**

One of Francis Kéré’s objectives in Gando is reforestation. In his studio in Berlin he tells us that “We haven’t learned to replant – we always thought that nature would take care of things. And things were indeed fine for a long time. In recent years, though, infant mortality in the region has fallen so rapidly that a veritable population explosion has occurred. Natural resources are being consumed at a tremendous pace and the forests are being chopped down.” Under early efforts at reforestation, eucalyptus trees were planted – a bad mistake and it is now known that they deplete the soil and impoverish nature. “I hate this stuff; it grows like crazy,” Kéré says laughing. He proposes using the good eucalyptus wood for construction and planting mango trees instead. Francis Kéré attaches great importance to agriculture in general. The pupils and teachers also cultivate a vegetable garden, which provides an additional source of food for the pupils and also combines academic education with practical activities. This is a way of avoiding potential mistakes: “Children will still be able to work as farmers later. The school has not removed them from their traditional structures; on the contrary, they have learned a lot of new skills.” The school opens up new opportunities without shutting out existing ones.
Kéré’s previous buildings in Gando were built using loam block. The walls of the secondary school however are being constructed of individual wall panels, cast in a two-piece steel form using unsieved loam, cement, gravel and lime. Slightly curved, the wall panels are inherently stable and stiff. Ringwall lintels and joints between the panels are in concrete. Up to three wall panels can be fabricated on site in two days by the people of the village under supervision of specialists trained by Francis Kéré.

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region. The building incorporates all the experience that Kéré and his co-workers have accumulated in Gando to date – and a series of other innovations. "The school is intended as an oasis where people love to learn," Kéré says, "and as a ground-breaking commitment to Burkina Faso, inasmuch as it is in striking contrast to the slipshod schools thrown up elsewhere." The rooms are constructed on a raised base and covered by a roof with a large overhang. This protects the load-bearing walls of compressed earth, which are covered with a coat of varnish. The massive earth walls and massive ceiling keep the sun from heating up the classrooms too quickly. Large openings in the gable walls ensure sufficient cross-ventilation.

"The main thing is that it stands!"
These measures do not go far enough for Francis Kéré. "I would like to build very, very cool rooms," he says. Accordingly, a special cooling system was developed for the school, as simple as it is ingenious. An artificial mound of earth is banked up against the rear wall of the school building. It is covered with vegetation and shaded by large mango trees. The earth of the mound is kept permanently moist with rainwater collected in underground cisterns – Burkino Faso can get very heavy rain at times. The hot wind now flows through openings into the cool hill and is filtered and cooled in the process. The air flows then through underground pipes toward the classrooms and is cooled further in the process. Finally, in the classrooms it rises as a cool, initially still moist breeze. Suction is created by the movement of the air in the space between the sloped roof cladding and the ceiling – this air is warmed by the sun, expands and flows out, drawing behind it through an opening in the ceiling the air rising through the floor. Kéré is convinced that “This system keeps the air in the classroom between six and eight degrees cooler than the air outside, and the perceived difference is much greater than that.” The cooling system is based on a combination of solar, wind, and thermal energy. The school uses hardly any electricity: just a little for artificial lighting and the school computer.

Eventually electricity will be provided by solar panels. Francis Kéré was long opposed to this because the villagers cannot afford solar panels and the school is intended to be a showpiece of local technologies. “However, we have not found another alternative.” Otherwise the materials used for the school are as simple as possible. The massive base is made of granite, the roof is corrugated iron, and the structure consists of thin reinforced metal. The unpopular eucalyptus wood is also used in the construction. Numerous details still have

“The school is intended as an oasis where people love to learn.” Francis Kéré
Everyone wants to work on the building: While the women produce the traditional earth floor, the men press the earth bricks for the walls.

to be decided. According to the architect, he works in Gando just as he would in a studio — much is decided on site. “It always depends on what is available at the time,” the pragmatist maintains. He says that he is not interested in sustainability per se. “I never thought: now we are going to look for a really intelligent material. All I thought was: this material is there. I am happy to combine materials with corrugated iron and steel — the main thing is that the building stands and can be managed by the local people!”

Project appraisal by the Global Holcim Awards jury

“An example for new sustainable construction.”

Burkina Faso is amongst Africa’s poorest countries and is situated in one of the hottest arid zones in the world. Hence, basic education and appropriate living conditions based on personal responsibility are dominant issues on the country’s path to a sustainable future. The secondary school in Gando is a lighthouse project providing outstanding contributions in this respect.

The jury was unanimously impressed by the school’s beauty and its innovative architectural concept, which combines both modern and vernacular construction methods, as well as by its social and educational impact. Locally-sourced clay is mixed with aggregates and cement to cast walls on-site based on a two-piece formwork. The school also shows how a low-tech, energy saving and low-cost climatic concept can be used in extremely hot weather conditions. Technical solutions including passive ventilation, underground cooling, and automatic irrigation are integrated into the architectural solution. Reforestation, greenery, stack-effect air currents, and double-skin roofs and façades are other important sustainable components of the clay building. To fight against the ongoing expansion of the desert and to prevent the dehydration of the ground, rainwater is captured and centrally stored for irrigating the newly-planted trees in the area. From a materials and technology perspective, the secondary school in Gando will set an example for new sustainable construction — not only in the arid Sahel, but in all developing regions around the world.

The project provides more than just a testament to the potential of locally-sourced materials. Built by the community, the construction process is considered to be an important part of the transfer of knowledge, whereby locals acquire new building skills that can be reused and taught. This common effort and on-site training of the residents in the vicinity of the new school substantially increases social cohesion among families and self-reliance of the whole community.

The jury commended this project due to these multifaceted and future-oriented elements. The comprehensive approach to this school project is an exemplary application of sustainable construction according to the five “target issues” for sustainable construction of the Holcim Foundation, and will have an undoubtedly strong impact on similar endeavors in developing regions.
Finding the music

The Paraisópolis favela in São Paulo offers few prospects for young people – and little public space for all inhabitants. The city authorities grasped the opportunity to build a large music school on an empty site. Beethoven in the favela? This combination has already proved extremely successful in countless other places.
“Monster” is an often misused term, but appropriate for sprawling São Paulo. Some 20 million people live in Brazil’s largest metropolitan region, making São Paulo the most populous city in the southern hemisphere. Its population has quintupled in just 50 years. Most of the people that continue to stream into the conurbation must erect their own shelter somewhere. As a result, the city now has about 600 slums, so-called favelas — illegally built settlements with totally inadequate infrastructure. Expansion goes on unabated, and very soon there will be no green space left within a radius of 25 kilometers from the city center. This is particularly problematic in the light of the massive environmental issues facing São Paulo: the city is the largest industrial megalopolis in Latin America, and up to now ecological concerns have not been taken seriously. The two main rivers, Rio Tietê and Rio Pinheiros, are biologically dead; air-pollution levels are alarmingly high — the city lies in a basin with far too little air exchange — and soil sealing exacerbates rainwater run-off, resulting in frequent heavy flooding.

Mudslides in paradise
Paraisópolis is one of the city’s 600 slums. The name comes from the Portuguese word paraíso, meaning paradise. An ironic name, for this favela in the south of the city is anything but a paradise. Fifty years ago the area was largely agricultural. There are hardly any streets because the topography with its many steep slopes and smaller and larger watercourses makes it difficult to build them. Owing to the development of the Morumbi district nearby, a significant number of construction workers have settled in Paraisópolis. Today, the favela has between 60,000 and 80,000 inhabitants living in 17,000 households. The population density is similar to that of Manhattan, although most buildings in Paraisópolis are only two or three storeys. In the meantime, the settlement has become a gigantic sea of houses. Every available square meter appears to be built on, although building sites in many zones of the favela are rated as high risk zones. For example, in the area that the residents call Grotão, grotto. Here new arrivals built houses on a steep slope. In 2008 it became obvious just how risky that was: heavy rains caused a mudslide that carried all the buildings down the hill. The authorities knew that if they did not take countermeasures the now empty space would be covered with new buildings in no time at all. In other words, a new approach had to be developed for Grotão. Elisabeta França had a suggestion: the director of the Secretaria Municipal de Habitação de São Paulo (São Paulo Secretary of Habitat – SEHAB) wanted to build a music school in Grotão.

The wonder of Caracas
A music school in a favela — Bach and Beethoven for people for whom the lack of classical music is probably their least concern? Outsiders may find the idea bizarre at first. In Latin America, however, it is common wisdom that classical music has enormous potential in slums. This development goes back to José Antonia Abreu, a Venezuelan musician, economist, and social politician. Almost 40 years ago he looked for a way to help socially disadvantaged children and youth in the slums of
Caracas to escape violence and drugs. The vision that he developed can be summed up as: instruments instead of guns. Musical instruction would educate boys and girls and provide psychological and social stability. El Sistema started in an underground parking garage in 1975 and has developed into the Wonder of Caracas. His unconventional idea has become the model for a global movement and now includes 400 orchestras, 342 choirs, 230 music schools, and 4,000 music teachers. Although it started in Venezuela, where El Sistema is now directly accountable to President Hugo Chávez, it now has programs throughout the Americas, from Canada to Argentina. The orchestras from the shanty towns have become an export hit: they appear at countless festivals all over the world and have cooperation agreements with many professional orchestras in Europe and the USA. Conductors such as Claudio Abbado, Zubin Metha, and Simon Rattle support the project. Gustavo Dudamel, Abreu’s former student and protégé, has become the symbol of the movement. Today, the Venezuelan, who completed the program in his home country, is the principal conductor of the Los Angeles Philharmonic Orchestra.

**Taking the idea to the experts**

About 350,000 children and young people currently receive instruction under El Sistema. The number grows by the day; founder Abreu hopes it will reach one million participants by 2015. El Sistema provides musical instruments and music tuition free of charge six days a week for children from the age of two in music schools where they find a safe and non-violent environment. Moreover, the music teachers work together with the city authorities to provide clothes and food for the students. The

“The strong cultural dynamic that fuels daily life in the favela will be receiving the physical infrastructure it needs to thrive.”

— Alfredo Brillembourg

Crowds gather for an orchestra performance, demonstrating the importance that music brings to the neighborhood.
business districts. "Informal urban settlements already produce as little waste and are as densely built as we are painstakingly trying to achieve in developed districts," Alfredo Brillembourg states. He and Hubert Klumpner are convinced that informal urban settlements can serve as a model for formal ones. Alfredo Brillembourg: “If we succeed in retaining what is good about slums and simultaneously improve the quality of life, we will achieve a situation that will make people want to live in these districts.” This would be a paradigm shift; up to now the aim has always been to adapt informal zones to the formal city. Yet Klumpner remarks: “We cannot approach the problems of informal settlements in the South with our customary arrogance. Often the systems sold there are precisely those that are the source of so many problems in the North and West. This approach blocks the opportunity of progress in development.” It is not just a question of urban repair, but of designing new possibilities to open up new levels of intervention and action. Klumpner uses the Swiss Federal Institute of Technology (ETH Zurich). What is it about slums that interests the two enough to devote almost their entire professional lives to them? “If, like me, you come from a very structured society, you experience some sort of culture shock when you first work in informal urban settlements,” Hubert Klumpner remarks. “But I find this work simply engrossing. It is like the choice between a spontaneous backpacking trip and booking an all-inclusive beach vacation – it’s clear which offers more adventure!” In addition, informal urban settlements provide the best opportunities for creating change: “The greatest need for action worldwide is in urban reconstruction in slum zones in the South – and also the greatest potential, because the states in question are undergoing a political sea change toward genuine democracy.”

Backpacking instead of an all-inclusive vacation

Alfredo Brillembourg was born in New York in 1961, and Hubert Klumpner was born in Salzburg, Austria, in 1965. Both studied architecture at Columbia University in New York City, where they met as graduate students and began their collaboration. Together, Brillembourg and Klumpner launched the Sustainable Living Urban Model Laboratory (SLUM Lab) at Columbia University, and since 2010 share the chair of Architecture and Urban Design at the Swiss Federal Institute of Technology (ETH Zurich). What is it about slums that interests the two enough to devote almost their entire professional lives to them? “If, like me, you come from a very structured society, you experience some sort of culture shock when you first work in informal urban settlements,” Hubert Klumpner remarks. “But I find this work simply engrossing. It is like the choice between a spontaneous backpacking trip and booking an all-inclusive beach vacation – it’s clear which offers more adventure!” In addition, informal urban settlements provide the best opportunities for creating change: “The greatest need for action worldwide is in urban reconstruction in slum zones in the South – and also the greatest potential, because the states in question are undergoing a political sea change toward genuine democracy.”

Learning from slums

The two experts believe that sustainable building means something very different in informal urban settlements than in central business districts. “Informal urban settlements already produce as little waste and are as densely built as we are painstakingly trying to achieve in developed districts,” Alfredo Brillembourg states. He and Hubert Klumpner are convinced that informal urban settlements can serve as a model for formal ones. Alfredo Brillembourg: “If we succeed in retaining what is good about slums and simultaneously improve the quality of life, we will achieve a situation that will make people want to live in these districts.” This would be a paradigm shift, up to now the aim has always been to adapt informal zones to the formal city. Yet Klumpner remarks: “We cannot approach the problems of informal settlements in the South with our customary arrogance. Often the systems sold there are precisely those that are the source of so many problems in the North and West. This approach blocks the opportunity of progress in development.” It is not just a question of urban repair, but of designing new possibilities to open up new levels of intervention and action. Klumpner uses the...
example of public transport: “It is not necessary for it to run at street level as at present, it could run in the air; for this reason we developed a cableway for an informal quarter in Caracas that carries people to the higher areas.” The Metro Cable project to which he refers is one of U-TT’s most celebrated efforts, and it has made a marked positive impact on transportation in the community of San Agustín, Caracas, where it operates.

**High culture instead of garbage**

U-TT’s numerous projects in Latin American slums are its best qualification for planning the CASM. Working together with the authorities, external experts, and Grotão locals, U-TT developed a fábrica da música for Paraisópolis. The project, which won the Global Holcim Awards Silver 2012, and the Latin America Holcim Awards Gold 2011, sits on a site measuring about 6,000 m². It is divided into two sections: a steep slope, and a flat terrain at the foot of the slope. Material from the buildings destroyed in the mudslide is still strewn across the plot, and the soil is sandy and full of mud holes; transforming it into a suitable building site will be a challenge. There are currently a few houses and a sports ground on the flat terrain, but rains often flood them. Because these structures and their inhabitants are in a high risk zone, they will have to make way for the projects so the ground can be stabilized to prevent future disasters. Replacement housing for the residents is planned for the upper zone. Commercial operations in the lower levels of the new houses should help to make the streets livelier and safer. The 25-meter-high, four-storey complex with music school and cultural facilities, the CASM, will be built on the site at the bottom of the slope. It will be accessed via a new street through the favela and linked to the surrounding landscape via a large ramp, a system of bridges, and the terraced landscape. The open design and easy accessibility are critical to the project’s success: the residents of Paraisópolis must regard the CASM as their own building, integrating it into community life, and assuming responsibility for its use and maintenance.

**“Informal urban settlements already produce as little waste and are as densely built as we are painstakingly trying to achieve in developed districts.” — Alfredo Brillembourg**

**Innovation at all levels**

The ground floor of CASM will feature new open sports facilities that can also be used by the orchestra as a covered performance space. According to Brillembourg, having a variety of programming is critical in ensuring community involvement: “We need the sports facilities so that the older kids have a reason to bring their younger siblings to music class. Whether music or sport, the important thing is that the CASM functions as a community center.” The two storeys directly above the open lower level are intended for the music school; there are large and small classrooms, practice rooms for soloists, and rehearsal spaces for the full orchestra. The top storey is designed for major events and performances: here the 165-strong orchestra and choir can perform in front of audiences of up
The hill also helps to cool the CASM: cool water is carried in pipes from the hill to the in-floor cooling systems on each level, where it absorbs heat, before flowing back to the hill. At night the water cools down again. All the electricity needed by the CASM is supplied by an 800 m² photovoltaic system on the roof that uses hybrid collectors.

Perfect fit – and not only here
Paraisópolis, like many districts in cities around the world, lacks safe public space and adequate social infrastructure. The entire CASM complex is designed as a community

Landscape and building work as one
The intelligent façade is only one component of CASM’s exemplary sustainability concept. “Landscape and building work as one system that can effectively handle the varying conditions of the cycle of seasons,” the authors point out. Whereas the warm northerly winds are blocked by the hill, a southerly breeze flows into the building from below. The exhaust air is vented through a chimney in which the necessary suction is induced by the difference in pressure resulting from solar radiation on the upper part of the stack. The hill is terraced to stabilize the topography and prevent mud slides after heavy rains. The resulting landscape forms a natural arena that the community can use for open-air concerts and a range of other purposes. Ingenious design and landscaping eliminates erosion; small wetlands passively filter rainwater, which can be used for gray-water applications. The hill also helps to cool the CASM: cool water is carried in pipes from the hill to the in-floor cooling systems on each level, where

The entire interior layout of CASM was planned in collaboration with José Antonio Abreu; he knows what El Sistema needs to function. CASM is designed so that up to 1000 children, youths, and adults per day can go in and out. For the acoustics Brillembourg and Klumpner consulted Karlheinz Müller of Munich, held to be one of the best acoustics engineers in the world. A lot of know-how has also gone into the design of the façade. The system developed by the architects is based on innovative concrete elements, which can be adapted for various purposes, including to meet the climatic conditions of the different seasons of the year. The elements for these adaptations can be manufactured on site, which will provide jobs for people in the favela.
In the regional phase of the 3rd Holcim Awards competitions, this project was awarded Gold in Latin America. See page 148.

“Unusually simple idea. Courage to answer difficult challenges with an ensemble of experts, and community approval—and the supportive city authorities—an innovative team. While there are many crucial factors in the Think Tank’s intervention in Paraisópolis could count on countless times all over the world, and Urban-Think Tank’s intervention in Paraisópolis could serve as a prototype for many similar projects. While there are many crucial factors in the realization of a project like CASM—including supportive city authorities, an innovative team of experts, and community approval—and the courage to answer difficult challenges with an unusually simple idea.”

“A green island in a terraced public space and room for urban agriculture.”

The jury was impressed by this proposal for a multifunctional public building in Paraisópolis, one of São Paulo’s largest favelas, because of its macro- and micro-scale approach to sustainability. Located in the heart of the favela, the Grotão Fábrica de Música (music factory) creates vertical density within the low-rise sprawl of the neighborhood’s informal housing and thus additional space and activity programs available to all residents. To address the lack of social and cultural infrastructure in the area, the building provides a music school, sports facilities, and transport infrastructure. Public spaces for social interaction are located around, under, and within the Fábrica de Música. Despite its central location, the marginalized area of Grotão is completely separated from the formal city. Within this isolated zone, increased erosion and dangerous mudslides have designated the site as one of the high-risk zones of São Paulo. The project structure retains and stabilizes the area’s challenging topography, creating a green island in a terraced public space and room for urban agriculture. The architects have proposed a variety of low-tech features. A water management system will be introduced to collect rainwater and reuse grey-water. Both the building and its amphitheater will adopt an integrated system of active and passive ventilation, cooling, and air conditioning. Building and landscape will thus combine into one system to effectively handle the area’s varying climatic conditions. The project is clear and powerful: it expands sustainability beyond the management of natural resources and takes it into the realm of social sustainability. The design process is participatory in both its initial phase and in the end use of the space. By applying locally-known construction materials and technologies, the project will create work opportunities for small-scale construction businesses in and around the neighborhood. The jury selected this project because it is a very strong and important intervention in one of the most conflicted areas of São Paulo. The proposed program has the complexity that brings satisfaction and opportunities to many of the people in the favelas. It provides social cohesion and additional jobs in a very efficient way, through the process of building a community center together.
Splashing out in the city

A collective of architects, designers and artists has been pursuing a visionary project for years: a gigantic swimming pool on a river arm in the middle of Berlin. Initially the idea was seen as incongruent with the formal grandeur of the city center – but support for urban renewal and remediation may yet change the face of this iconic precinct.
From lifeline to wastewater canal

One of these was the river pool. The idea arose in the art group’s first year. Tim Edler recounts: “One inspiration was the fact that the collective’s office was close to the water, on the Kupfergraben directly opposite the Bode Museum.” We often talked about how nice it would be to jump into the river to cool off; we found it bizarre that the Kupfergraben had not been used for 120 years.” Over the
centuries the River Spree has had various uses, in the city’s early days primarily as a transport route, and later to provide energy, a means of defense, and irrigation. From the 19th century onward fewer demands were made on the river and eventually the city started to fill in disused sections of the river, for instance after World War II, when enormous quantities of rubble needed to be disposed of. The city’s former lifeline degenerated into a wastewater canal. This is evident from the mixed wastewater system in Berlin’s inner city districts, which does not separate rainwater from wastewater, so that after heavy rainfall the overflow runs directly into the Spree. As a result, also wastewater that should flow through the sewers ends up in the river. This is not only unappetizing, but also a health hazard. This explains why the city administration expressly advises against swimming in the Spree. In all of Berlin there is not a single river pool and no direct access to the water anywhere; you have to leave the city to find a stretch of riverbank without a quay wall.

Free admission for everybody
These drawbacks did not deter the collective from developing its project. Their vision: a gigantic pool, a river pool, with a water surface of 21,400 square meters in the disused river arm against the backdrop of the world-famous Museum Island. A broad bank of steps leads from the Lustgarten, the square in front of Berliner Dom (Berlin Cathedral), and in front of the future reincarnation of the Stadt-Schloss (City Castle) right down to the edge of the water. While the design includes unobtrusive functional changing facilities and lockers in the pedestal of the former national monument for Kaiser Wilhelm I., the river pool is explicitly conceived of as a public amenity: anybody can jump in to cool off or swim without paying for admission.

Two measures will ensure that bathers do not find themselves swimming in wastewater. Currently, the sewage overflow from six emergency outlets spills into the canal; the project will channel this overflow into a spillwater pipe that will run under the river pool. In addition there will be a water filter in the river above the pool: the controlled flow of water into the canal will be purified by natural means as it passes over a 780-meter-long filter basin.

A filter 390 meters long
This 7,200 square meters constructed wetland consists of a gravel filter 0.8 meter thick, covered by an average of about 0.5 meter of water. The filter is able to purify inflowing impure river water to the quality of drinking water. The filtered water is collected and led away through drainage pipes below the sand packing. The upper side is planted everywhere with various marsh, shallow-water, and deep-water plants, designed as a linear public park. The 640-meter uppermost section of the river that continues from there will be renaturized. To this end, the northern shore wall will be completely removed and the course of the river gently widened into the grounds of the Fischerinsel. As an auxiliary purpose, this section serves as an inner city green area and preliminary water purifier. The actual main purpose of this side arm of the river is as a wildlife refuge, to support the resettling of riparian flora and fauna in the channeled main arm of the Spree River in Berlin’s urban area. “The Spree as a whole is a stressed river,”

“We found it bizarre that the Kupfergraben had not been used for 120 years.” Tim Edler
“Berlin is becoming more ambiguous and diverse.” Tim Edler

Tim Edler remarks, “its self-regenerating powers are still weak, and the river is very susceptible to environmental changes: at high temperatures, for example, blue-green algae quickly form.” But time has worked in favor of the project: the steady reduction in lignite open-cast mining in the Lausitz region, which was a major source of pollution in the River Spree, means that the water that reaches Berlin today is cleaner than it used to be, and that, in turn, means that demands on the plant-based wastewater treatment system will be lower than initially assumed.

The dawning of an age
When the authors went public with their idea they were under no illusion about people’s likely reactions. “We knew that the river pool was not in keeping with the spirit of the time,” Tim Edler says. Then, less than a decade after reunification, Berlin was caught up in a frenzy of development. Massive buildings were going up everywhere. In Tim Edler’s view, “The types of structures being built were expected to recreate the sense of what was believed to be Berlin’s golden age in the 19th century.” By looking back to the past, the search for a new identity produced an extremely prestige-focused derivative architecture. “Concepts of lightness found little recognition at this time; architecture tended to be stiff and formal.” But he thinks that there are clear signs that this epoch is over. A stroll through the city leaves a different impression: rather bombastic building projects are still going up all over the place. But Tim Edler says that these are ideas of the recent past that are now being worked off. He remains confident: “Change is happening! For example, the new Senate’s director of urban planning is more open toward lighter projects.” Edler continues that colossal projects are also becoming rarer because the enormous amount of space they require is no longer available and public criticism of monumental projects is growing louder. He comments: “For a long time many people did not question the local attitude to architecture. It was thought that a different opinion would be damaging to one’s interests. As a result, the force of change is all the greater.”

From vision to project
The authors hope that their project will produce an impact far beyond its immediate significance – the river pool as kick-off pool. Tim Edler points to the rapidly escalating inner-city density. “Many informal recreational spaces no longer exist, with a corresponding loss of space for recreation and sport. Of course our river pool would not offer the quality of a typical lido with a large lawn for hanging out. But it would be a unique sports facility and a wonderful message for people: just look what is possible in your city – now do something about the rest!” Whereas in earlier years their concept was regarded as utopian, today it is taken more seriously. “You can just sense that new developments are afoot in Berlin,” the architect remarks. “The city is becoming more ambiguous and diverse.” In this context the river pool offers new possibilities by converting an existing context – just about everything needed to realize the river pool is already there. As Edler points out, “In recent years nature has come to play a far more important role in our lives and in the process we have learned to see water differently.” The river front has become a desirable address and cafés, bars and restaurants have moved onto the bank of the Spree; the city’s onetime backyard is now its calling card.
“We are developing something with real appeal!”  
Tim and Jan Edler
course it will cost a lot of money to put in a new sewage system to keep the River Spree clean all the time. But Tim Edler is convinced that “money is not necessarily the problem. It is about being aware: when the appetite has been sparked, changes are possible. Once people accept that the river is not there only for the declining volume of traffic, the city will also invest in its cleanliness. The most valuable aspect of our project is that it could whet people’s appetites.”

Opposition expected
Even though many people in Berlin would welcome a river pool in the middle of the city, the authors expect opposition. There are residential buildings close to the plant-based wastewater treatment plants – will the inhabitants object to the project because they think the plant will attract mosquitoes? And how will the museums react to the project? Tim Edler thinks that it is unlikely that the voices of conservatism in Berlin will rush to support a project for everyday utilization of the river bank: “I would be very surprised if there was not a lot of skepticism.” Some of the quay walls along Lustgarten that will be affected by the river pool were designed by Karl-Friedrich Schinkel, the master architect who more than anybody else shaped the neo-classical taste of 19th century Prussia and the appearance of Berlin. Any attempt to interfere with structures associated with him triggers opposition. The Museum Island is a tourist magnet, which also makes innovations tricky. Tim Edler is well aware of this: “The Museum Island is Berlin’s holy grail, so to speak – you have to be very careful about proposing interventions.”

Project with appeal
In the project data for the Holcim Awards competition the authors gave 2018 as the estimated start of construction. Tim Edler admits that “this is optimistic planning, of course, and the date is uncertain. Nevertheless, I think it is possible that we could be swimming in the river pool before the end of the decade.” It is difficult to say anything about

“When the appetite has been sparked, changes are possible.” Tim Edler
the political dimension of the discussion, but Tim Edler emphasizes once again: "The project is right for Berlin, which is a fairly laid-back city. I am not a fan of the trend in the past 20 years of tidying up places, and many others feel the same way."
The interesting point is what this leads to: too much orderliness is harmful for a metropolis. Every city needs an element of non-conformism, of unfinished

"A direct and strong impact on the quality of urban life."

The jury appreciated the poetic metamorphosis of a rather undefined public space in the historic city center of Berlin into an activated urban landscape. The project will transform the Kupfergraben canal, an underutilized arm of the River Spree, into a natural, self-cleaning body of water. Along this 750-meter stretch by the Museum Island, people will be able to walk, bike, swim, or just relax.

The Flussbad is more than just a big swimming pool. It proposes a playful amenity on a site that is culturally and politically loaded. The existing conglomeration of museums will be enriched with this simple but atmospheric gesture that provides a public urban recreational space both for residents and tourists. The strength of this project is that it rightfully questions the ownership of the river, which is today exclusively used for shipping and drainage, and never for public activities. The architects have proposed necessary changes in the waste water system along this stretch of the river as well as the creation of an ancillary bypass canal and a filter basin of plants in the upper segment of the canal. In combination, these changes will improve the water quality of this part of the Spree to meet the standards necessary for swimming.

In addition to its ecological and public benefits, the jury also appreciated its symbolic power. It sets a strong example for sustainable water use, waste water management, and how these issues can be coupled with the continued urban development of the UNESCO World Heritage listed historic center of Berlin. It will have a direct and strong impact on the quality of urban life and will make a positive ecological contribution through the remediation of the city’s waterways.

The jury commended this project because it is a convincing example of what could be achieved with challenging densely built inner city areas having a rich tradition and a stock of important heritage buildings, but where the needs of the public have been neglected over decades. The result will be a comprehensive recapture of a large waterway and its riparian fringe by the citizens, one of the most important attempts towards sustainable urban life.

Project appraisal by the Global Holcim Awards jury

In the regional phase of the 3rd Holcim Awards competitions, this project was awarded Gold in Europe. See page 108.
Floating on clouds

Spanish architect Carlos Arroyo has transformed a disused factory building into the new city hall and civic center of the small city of Oostkamp in Belgium, at minimal cost. Working with a very limited budget he has created a new civic and administrative center that is fun to be in.
Where Coca-Cola used to be bottled, couples are being married today.
We decided to preserve the existing structure in its entirety. 

Carlos Arroyo

The indoor landscape of luminous clouds creates a friendly environment for a vital community life.

Ceci n’est pas une pipe (This is not a pipe) is the inscription on a famous picture “The Treachery of Images” by the Belgian painter René Magritte created in 1929. This statement next to a naturalistic painting of a pipe points out that even the most realistic copy is not the object itself. Ceci n’est pas une ...administratif centrum! (This is not an administrative center) was the topic for a competition for a building design in Belgium. Oostkamp, a small city near Bruges in West Flanders, organized the competition in 2008 to elicit ideas for a new city hall and civic center for its 23,000 inhabitants and 170 council employees. The competition motto was chosen to emphasize that the design for the new building need not stick to traditional conceptions of a civic center. The starting point, after all, was anything but conventional.

From Coca-Cola to OostCampus

In 1991 Coca-Cola built a plant on the main street of Oostkamp. 15 years later, as part of its consolidation of production centers in Belgium, the company closed the plant. The municipality jumped at the opportunity and bought the site with the huge factory building. It wanted to use the plot for a campus that would centralize all municipal services from the council to street-cleaning in one location. The commission was eventually given to Carlos Arroyo, a Spanish architect born in 1964. He recalls: “The municipality had a vision for its relationship with its citizens: the administration was to be more transparent and more democratic.” A specialized office of the government of Flanders helped the municipality to organize the competition for the new civic center. The architect explains: “The first round was open to any architectural office interested in submitting a dossier. The specialized office chose ten of these entries; the municipality selected five of these and commissioned a detailed project from each.” The competition brief outlined various scenarios of how to deal with the existing industrial hall. One possibility was to keep part of it. But Carlos Arroyo Arquitectos in Madrid went a step further.

Retaining grey energy

“We other competitors wanted to demolish the entire hall or recycle only the steel in the building,” Carlos Arroyo explained. “But we decided to preserve the existing structure in its entirety.” The architects paid particular attention to details that are, as a rule, overlooked: the foundation and the technical infrastructure. Moreover, the industrial hall stood on a thick and extremely stable concrete slab that stores a lot of energy. Arroyo and his co-workers decided to retain the 11,000 m² hall and transform it through soft interventions. Naturally they were aware of the risks of this approach. “A proposal to recycle an old building is difficult to defend,” the architect explains. “People don’t really like the idea that the new building will look like the old one.” In particular when the existing building is a pretty unsightly industrial hall. But the Spanish architectural office had one crucial argument in its favor: the economy.

To the end of the list

The authorities in Oostkamp knew that with their limited budget of EUR 5.5 million not all of their wishes could be realized. Accordingly, the competition brief included a list of priorities and asked all applicants to draw a line somewhere on the list. “Thanks to our concept, we were able to draw our line almost at the bottom of the list,” Carlos Arroyo remarks. Provision has been made for the few things not included, but they have not yet been realized: there is a place for the municipal archives, which have still to be installed, as well as a screen of vegetation along one façade and a small wind turbine, both of which are planned to be added later. The careful use of existing resources reflects the approach of Carlos Arroyo Arquitectos to sustainable building: “We act on the principle of cost and benefit and pay very close attention to the amount of resources we put into a project – and not only in terms of money.” Of course, this concept is not enough to make a building project interesting. The architect’s conviction about sustainable building includes another dimension: “We want sustainability to be fun!”

Building for fun

“If you only consider the resources, you can easily forget that we build to make people happy,” Carlos Arroyo remarks. People’s sustainability actually peaks when they are dead — namely as a source of raw materials for the environment. “But as long as we are alive, we should also have some fun.” This explains why he not only wanted to transform the factory as cheaply as possible, but also wanted to make it as a place to be in. “We can’t convince everybody to live ascetically, so this is the only way to make a success of sustainable building,” Carlos Arroyo explains. “If we succeed in living sustainably and can enjoy doing it, perhaps other people will join the party.” In other words, the challenge was to transform a fairly unattractive place into an exciting one. In this respect Carlos Arroyo is guided by an observation: “In the 21st century fiction is a key driver. Experiences are more important than objects — theme parks are the ugly side of the spirit of the age, so to speak. So our approach was to use simple means to make a change that people can experience as such.” So much for the theory — but how do you turn a cold, unsightly industrial structure into a lively urban meeting place where people are happy to be?

Through the woods and into the clouds

The main entrance to the new civic center is through a porch of steel columns that needed fire protection. The architects have tweaked the columns into stylized tree trunks with a little trick: a layer of concrete was modeled as bark, and by growing vegetation over it the porch will become a leafy canopy. On entering the civic center through this little artificial forest, visitors find themselves floating in the clouds, as it were. Arroyo explains: “Our idea was to take the existing space and, without making a fetish of it, transform it into a landscape of white clouds.” Under the existing roof of the hall the architect has created a sky of overlapping white bubbles made of glass-reinforced gypsum (GRC). His initial intention was for the bubbles in his cloud landscape to be cast in bundles. For this purpose, formwork was inflated in the hall to the desired sizes and a seven millimeter thin layer of GRC sprayed on each. However, after preliminary clarifications this construction procedure was discarded. Now every bubble is made of components each covering 12 square meters. Each element is calculated by computer, cast in a
“We want sustainability to be fun!”

Carlos Arroyo
specially manufactured molds, and then integrated into the other elements. In the mild indoor climate this landscape of luminous clouds is a perfect setting for official receptions, small markets, presentations, council meetings, or weddings. The example of weddings demonstrates just how seriously Carlos Arroyo took his vision of a place of joy and happiness. Because in Belgium a couple cannot count on the sun shining on their wedding day, the architect has created an artificial sun in the civic center: thanks to a disk of LEDs, the newly-married couple will appear in the best light in their wedding photographs.

Offices in dendrite clusters
The artificial landscape of clouds floats above not only the public spaces, but also the counters, meeting rooms, and offices of the municipal administration. Every unit is distinguished by an individual pattern in its wooden walls, monitors are used for the orientation system and information points. The structures installed in the hall are clustered together by administrative unit and function in a series of radiating modules. The architect calls them dendrites. “The idea of dendrites is not a simple metaphor, but a construction characteristic: the office structures are a web that grows and can change.” If at some point it is necessary to regroup or expand the offices, the walls can be shifted without much effort. The spatial arrangement was developed in close cooperation with the city employees. The architects visited every public service building, spoke with the people who will later be responsible for the maintenance of the building and materials, and held a series of workshops with authorities and workers. Carlos Arroyo says: “We studied how the municipality interacts with the public.” The participatory planning not only shaped the basic plan of the spatial arrangement, but we were also able to add valuable minor elements into the project. “Thanks to our visits to the municipal employees we learned that when the street-cleaners returned from sweeping streets and plowing snow they liked to gather around a small stove,” the architect recounts. “The workers burn waste wood in it to warm themselves up. This meeting place is very important for them – so we decided to install a place like this in the canteen for all municipal employees.” Under a bubble at the entrance there is an iron stove with a bench around it; in other words, the architects have planned a fireplace in the canteen of the municipal administration.

Between art and technology
Perhaps the key to the unusual design of the huge space and its innovative use of technology can be explained by Carlos Arroyo’s career. Architecture is the Spaniard’s second profession. Initially he studied linguistics and worked part-time as a carpenter and as a photographer of social topics. “I wanted to be an artist, but was not sure how to become one – or even what art was,” he recalls with self-irony. But then photography, his interest in social topics, and carpentry all came together. “At first sight they seem to be very different things. But taken together the result is what architecture is all about. As an architect I want to create a
good environment for people; this is always a question of communication and technical solutions.” Initially, the municipality was skeptical about involving white glass-reinforced gypsum bubbles. Carlos Arroyo comments: “We extended the project planning phase by a month so that we could test its feasibility.” The architects had to determine whether they could find at least five providers who could realize in one way or another the bubble design using GRG, “Otherwise there would not have been enough competition – which would have meant that the bubbles could not be made at a reasonable price.”

A building with climatic zones
Aside from creating a unique spatial experience, the GRG bubbles also have a technical function: The gypsum ceiling provides thermal insulation. The architects have also found novel solutions to control the climate in the civic center. “We have integrated two approaches,” Carlos Arroyo explains. “The first is based on thermal inertia. The hall is erected on a massive concrete slab, which stores a lot of energy. We measured the temperature in the hall in December when it was below zero outside. Just a meter away from the façade it was already 14 degrees.” This knowledge is the basis of the second approach, that of climatic zones. In a building open to the public the temperature does not have to be a homogeneous 21 degrees. “When people enter the civic center they don’t have to remove their coat immediately and carry it around,” Carlos Arroyo elaborates. “It is enough if they perhaps just unbutton it first and read the monitor to find out where they need to go.” 15 degrees is enough for that. Just the work places and the meeting rooms are properly heated; the temperatures in the other two climatic zones are somewhat lower, but not fixed. Only when the temperature in the public zones drops below 15 does the “emergency heating” come on. The concept of climatic zones makes the building comfortable for different uses and saves energy. As Carlos Arroyo explains, “The reasons are twofold: the volume of space to be climatized is smaller and the heat loss between several zones with smaller temperature differences is lower than in the case of a single large difference.”

Award for all involved
Are the unique concept and design of the Oostkamp Civic Center transferable? Does it offer solutions for other tasks and problems? The architect is convinced that it does: “The project shows that existing structures can be completely recycled in a fun way.” Or perhaps must. The municipal authorities of Oostkamp have assured Carlos Arroyo that “Now that we see what the civic center will look like, we are convinced that there really is no other way to realize this project.” Even if the doubts about Arroyo’s vision have long since vanished, confirmation cannot do any harm. For the architect this is the real value of the Holcim Awards Silver 2011 Europe: “To realize an unconventional project like this you need to have all the necessary data and facts and be convinced of your own idea; the award is a welcome confirmation – also for the city and for all persons involved.” Therefore, on the day after the award ceremony in Milan, Carlos Arroyo traveled to Oostkamp and handed over the award to the city: “The Holcim Award recognition was awarded to all of us and should stay here.”

“A proposal to recycle an old building is difficult to defend.” Carlos Arroyo

In the regional phase of the 3rd Holcim Awards competitions, this project was awarded Silver in Europe. See page 110.
Turning the high-rise upside down

What do you do with a decommissioned freeway viaduct? Demolition costs a fortune, so in southern Italy a competition was organized to find alternatives. Philippe Rizzotti and his team have come up with an interesting solution by reinterpreting the principle of the high-rise.
The spinal cord of Italy’s road network is a motorway that stretches some 1,250 kilometers and built over three phases. The motorway started in Milan in 1929 and was finally connected with Reggio Calabria at the “toe” of Italy in 1974. Countless people have traversed the length of the country on the Highway of the Sun – long-distance truckers, sun-seeking tourists, and foreign workers visiting their families. The southern stretch of the motorway, the A3, is almost 500 km long and is of enormous importance for the less developed south as it provides a fast route to Rome and the economic powerhouse of northern Italy. When the 443 km stretch between Salerno and Reggio Calabria, the longest section of the A3, was opened in 1974, all of Italy celebrated the completion of the largest infrastructure project ever undertaken by the Italian state. As it approaches Reggio Calabria the motorway weaves its way along the green coast, frequently disappearing into one of the many tunnels or soaring over the numerous viaducts that offer spectacular views across the Tyrrhenian Sea to the Aeolian (Lipari) Islands and nearby Sicily.

Combatting the ravages of time
Time also left its mark on this mighty infrastructure and tighter safety regulations highlighted the need for structural improvements. Accordingly, refurbishment of the motorway has been ongoing since 1997. Numerous sections have already been finished, and the entire project is scheduled to be completed in 2013. Part of the refurbishment calls for the decommissioning of a stretch of motorway of ten kilometers between Bagnara and Scilla, around 30 km north of Reggio Calabria, which is being replaced by a section that will be largely underground. The decommissioned structure includes several viaducts. For many years the authorities have been looking for alternatives to demolishing the by-passed sections of motorway – the demolition work would cost about EUR 60 million. In their search for solutions, the regional administration of Calabria and its partners organized an international competition for the Parco Solare Sud (Solar Park South), the piece of motorway covering 20,000 square meters. The authorities hoped that the competition would generate ideas for re-using the bypassed motorway sections, perhaps for boosting renewable energy generation.

Ideas from around the world
The competition organized by the region of Calabria, the province of Reggio Calabria, the neighboring municipalities of Scilla and Seminara, the motorway company ANAS, and the Università degli Studi Mediterranea di Reggio Calabria received applications from about 500 architectural offices all over the world. A total of 214 valid project proposals competed for the first prize of EUR 20,000. Most of the participants retained the character of the existing structure: even after redesignation the motorway should remain an infrastructural edifice. The 15-member jury that evaluated the proposals was made up of architects, engineers, biologists, and sociologists. Among them was Patrick Blanc, a Frenchman who has made a name for himself with vertical gardens, and joint winner, with Luigi Centola, Global Holcim Awards Silver winner 2006. The jury awarded the third prize to a team from Colombia which submitted a proposal for turning the viaduct into a plant-covered international center for environmental education. The second prize went to an Italian team that proposed producing energy by mounting wind turbines between the four highest piles of the Viadotto Favazzina. The first prize was won by a French team whose vision was more original than all the others.

The sculptural megastructure
The team was put together by Philippe Rizzotti, a Parisian architect born in 1978. He recalls: “As a student I was fascinated by a picture I once saw of a project by Norman Foster for an architectural megastructure. My response was to make my own collage of such a sculptural megastructure, and when I saw the invitation for the Solar Park South competition I immediately took my collage for a vertical village out of the drawer.” At the same time it was clear to Rizzotti that he would not be able to submit a competition entry on his own; so he asked his Parisian colleagues Samuel Nageotte, Tanguy Vermet, and Manal Rachdi whether they would like to take part in the project. The four young men spontaneously formed a working group in which, according to Samuel Nageotte, they complemented each other perfectly. “Philippe is one of the best

“We were utterly astonished that better use is not made of this uniquely mild climate.”

Tanguy Vermet
“Sustainability begins with the right attitude.” Philippe Rizzotti
visualizers there is, Tanguy knows how to formulate concepts – each of us contributed his particular talents.” Before the group sat down to draw up their competition entry they spent a long time chewing over the project. “We talked at great length about our ideas, and then the design came together very quickly,” Nageotte comments.

Where the bergamot orange is at home

Starting with Rizzotti’s vision of vertical residential units, the four architects gave a great deal of thought to what actually set the region around Bagnara and Scilla apart. Tanguy Vermet recalls: “In the process we discovered that 95 percent of all the bergamot oil in the world is produced in this region.” This small citrus, a hybrid of lime and bitter orange, is cultivated for its essential oil and is extremely sensitive to the environment. Tanguy Vermet explains: “The cultivation of the bergamot orange needs temperatures of between ten and 30 degrees Celsius all year round.” He continues: “We were utterly astonished that better use is not made of this uniquely mild climate.” They wanted to find something to counter this reticence – and realized that a region suitable for the bergamot orange must also be suitable for people. Especially older people. Elaborating on the phenomenon of the North American “snowbirds,” people who spend the winter in Florida or other southern states, the team gradually developed the idea of winter apartments for European snowbirds, an idea that merged with Rizzotti’s vision of a vertical village.

A nest for European snowbirds

How did the young men design their lifestyle apartments for European pensioners under the southern Italian sun? Rizzotti, the main author, explains: “We worked on the premise that the viaduct can accommodate about 200 residential units.” The basic idea is to concentrate all public functions such as retail space, medical facilities, and cultural offerings on the bridge. The residential units are grouped around the piles. As Samuel Nageotte explains, “People park their cars in the tunnel leading to the viaduct and proceed along the bridge before descending to their apartments.” The architects have turned the high-rise upside down: The piles had to be structurally reinforced to accommodate the apartments along the piles. Philippe Rizzotti: “There are several ways to stabilize the existing structure. We’ll install the elevator shafts and utilities in the piles and fill the remainder with concrete. The structure will be externally reinforced with a steel frame.” The apartments and green areas will be erected on these steel platforms.

Like a coral reef

“We want our project to be the starting point of a new, vital village.” Samuel Nageotte

“Of course it is more complicated to build on a cantilevered platform than on an open field,” Philippe Rizzotti adds. “For technical reasons it makes more sense to sell the building space individually, and at the same time specify the type of construction. Buyers are then free to configure their apartment within this scheme.” Hence, the vertical village will grow around the viaduct apartment by apartment, like a coral reef on underwater rocks. This also makes the project financially viable; it would
hardly be possible to finance and build the entire village before anything is sold. And the prices? In conventional high-rises the higher the unit the more expensive it is; what about the prices when the complex is upside down? “We have not yet thought about that,” says Philippe Rizzotti, “at the bottom you are closer to nature, and at the top you have a better view of the sea; it would be nice if the prices were the same at all levels.” Tanguy Vermet adds: “The prices are more likely to vary from pile to pile; the pile in the middle will certainly offer the best views.”

Geothermal energy
For environmental compatibility the architects make the most of the strengths of the locality. The village is only about 80 km away from Mount Etna on Sicily, the highest volcano in Europe. Etna is permanently active. The volcanic terrain is eminently suitable for producing geothermal power. “In the earth’s interior the temperature rises rapidly, so we do not have to drill very far,” Tanguy Vermet explains. Water can be injected underground and heated for household use and to generate electricity. The water itself comes from a sustainable source: rainwater is collected on the viaducts and stored in tanks in the disused motorway tunnels. For the architects sustainability is not limited to such technical facilities. Philippe Rizzotti speaks for the team when he says that “sustainability begins with the right attitude, and that means that you have to take into account all variables and not leave something out just because it could involve too much effort or too much expense.” Tanguy Vermet adds: “Planning a building just so that it is sustainable doesn’t interest us. Rather, we asked ourselves the question: What else can you do with this ruin?” Saving the gray energy of the old viaducts and investing money in something new rather than in demolition is in itself already an act of sustainability. In addition, demolition would have impaired the diverse ecosystem that has developed around the decommissioned motorway to a far greater degree than transforming it would.

Starting point for a new center
The architects led by Philippe Rizzotti are the only team to have proposed turning the viaduct into a new living space for people — thereby triggering a chain reaction that will support a sustainable economic system. However, the architects are aware that many aspects of their vision are still unresolved. “We took part in a competition that called for ideas and are not sure whether our project will ever be realized,” says Philippe Rizzotti. However, the response among the public and in the media in Italy has been positive, and the team will certainly pursue the idea. As a matter of fact various questions still have to be resolved. Samuel Nageotte admits: “The social relationships with the existing towns of Scilla and Bagnara are still not clear. We would like our project to be the starting point of a new, vital village.” Depending on the further development of the project, the winter village for older Europeans may perhaps become the germ of a university campus or an outdoor activity center for locals. The architects’ objective was to present an unconventional idea to demonstrate that the old transport infrastructure in the breathtakingly beautiful environment could be revitalized — and in this they have unquestionably succeeded.
Into the cold

The Arctic Food Network, the brainchild of Mason White and Lola Sheppard in Toronto, could steer life in Northern Canada in new directions by championing traditional practices. The simple sheds along the most important snowmobile trails combine modern technology and the requirements of a traditional culture.
Lola Sheppard and Mason White.
Baffin Island – which the Inuit call Qikiqtaaluk – lies in the Canadian province of Nunavut, in the far northeast of the country. The climate here is unrelenting. Owing to the northerly air currents, temperatures here are noticeably lower than anywhere else in the Arctic Circle. Whereas in the southeast of the island the spring thaw starts “already” in early June, you have to wait until July in the north. The annual average temperature on the island is −8.5 degrees. The sea is frozen most of the year. The sun sets on November 22 and rises again on January 19. Yet people have settled here. About 15,000 people live in 11 villages and hamlets – 12 including Coral Harbour on Southampton Island. The distances between the settlements are huge. Iqaluit, the capital, has 7,100 inhabitants. The closest community to Iqaluit is Kimmirut, 100 kilometers away; Pangnirtung, the next closest, is 300 km away. The distance between Iqaluit and Arctic Bay in the north is 2,000 km – as far as from New York to New Orleans.

Province with problems
The architect Lola Sheppard recalls: “I stood on a hill and looked down on Iqaluit below me and was suddenly hit by the sad truth that every single item in this little town has to be flown in.” Because the province of Nunavut is difficult to reach, in the shops everything is more expensive than elsewhere in Canada: a bucket of Kentucky Fried Chicken sets you back 28 Canadian dollars, and a box of Fruit Loops that you can buy in Toronto for 3.99 costs 12 dollars here. It also costs a lot to maintain a functioning infrastructure – energy, water, food, etc. The primary sources of employment are government, mining, and services. Fifty percent of the 33,000 inhabitants of the Province of Nunavut are younger than 25. At the same time, the school drop-out rate is 75 percent. Alcoholism, drugs, unemployment, and crime are major issues. Moreover, large numbers of young people are not interested in the traditional lifestyle of their forefathers.

Iceland, Russia, Canada
It is in this inhospitable region that Mason White, born in 1973, and Lola Sheppard (1972), also known as Lateral Office, are pursuing an ambitious construction project. They first got interested in architecture in the far north through a competition in Iceland for a design to repurpose an airstrip built in World War II. After that, White was awarded a research scholarship to study the architecture of the sub-polar regions of Russia. “One day I found myself thinking: Why aren’t we looking closer at our own North, the Canadian North?” the architect recalls. “Of course, I knew the answer: because the far north of Canada has a very complex cultural history, and one that Canadians cannot always be proud of. Some decisions about sovereignty and cultures of the Inuit and the other native peoples are questionable in the extreme.” So people tend to ignore the region and leave it to its fate. Sheppard sums up: “Although some architects draw up proposals, these projects tend to have a utopian element.”

“It is fascinating how Inuit culture is currently modernizing.” Lola Sheppard
She adds that the British-Swedish architect Ralph Erskine is the only one to have really studied the unique geographic, cultural, and economic features of the North, and this was in the 1970s. Lola Sheppard comments: “Yet it is fascinating how Inuit culture is currently modernizing.” That said, in the course of their studies Sheppard and White noticed that when huskies are replaced by snowmobiles and personal encounters by cell phones, there is a danger that the knowledge of ancient and sustainable traditions will be lost, many of which offer great potential solutions for the future in respect of food procurement, transport, and social exchange.

**Tradition without nostalgia**

This prompted the architects to develop the Arctic Food Network (AFN) project for Qikiqtaruk Island. White and Sheppard wanted to show that there was a way in which the inhabitants of Nunavut could combine old methods and new, sustainable technology to maintain their cultural independence, and even regain what had disappeared. A century ago the island did not have the slightest trace of a CO2 footprint. That changed overnight when modern products began to arrive by plane. “One very important function of the AFN project is to demonstrate that the traditional way of life has enormous advantages and can easily be combined with contemporary expectations,” White explains. “But nostalgia has no place in this perspective. Tradition only makes sense if it continues to evolve.” For the authors, one of the most important aspects of the AFN is its social and cultural dimensions. As Sheppard points out, “Sustainability is not only a question of technical means and CO2 emissions. In many of our projects we also investigate how architecture and infrastructure can influence the development of new life styles.”

**Modern and flexible sheds**

The network developed by the two architects consists of approximately 24 hubs. Each hub comprises a number of sheds and is approximately 160 km from the next hub or settlement. In contrast to the collection of seasonal fishing huts that the Inuit used to put up as needed, the AFN sheds are permanent and can be used in any weather. The network utilizes the existing snowmobile trails. Today snowmobiles, or skidoos, have replaced dog sleds as the Inuit’s preferred method of transportation. It takes a day to cover the 160 km between two hubs by snowmobile. Similar to alpine huts in some parts of Europe, the AFN sheds are ready for travelers who want to rest or seek protection against the elements. The simple structures are also designed so that they can easily be adapted to a variety of purposes, depending on the environment. Incidentally, “shed” is the right word: “We are happy that the structures appear so simple,” White says. “The contrast between their appearance and the impact on the culture of region is all the greater.” The sheds can be built on land or ice, or under permafrost, or can float on water.

The snowmobile trail is not the only factor that determines siting. Other criteria include the proximity of harvestable food products: hunting or fishing grounds and places where berries and edible plants grow. This supports the consumption of “country food” or natural sources of food.

**Multipurpose building for all weather**

Essentially, the AFN sheds are simple structures with a 10 to 15 meter smoke stack. They are constructed primarily out of prefabricated and reclaimed wooden elements, wire mesh, and aggregates, and assembled on site. Snow is packed in wall cavities to provide an additional layer of insulation. The outer walls have a copper skin; this metal has already proved itself in other cold climates, for example in Norway. Copper is malleable: in warm temperatures it softens and adapts to the wood; in cold temperatures the metal becomes hard and follows the contours of the structure. The sheds fulfill a number of functions. Skidoo drivers can cook themselves a meal, spend the night, or even fish. In some sheds the floor offers access to the bare ice; Inuit can hammer a hole in the ice for fishing, as is their tradition. However, in the shed they can fish without braving the elements as they once had to. Cold storage facilities are installed at ground level or underground in the deep permafrost, in
“We investigate how architecture and infrastructure can influence the development of new lifestyles.”

Mason White

which meat and fish can be stored for months at a time. The sheds can also be equipped with floating supports in case the ice on which they stand thaw in the short summer.

Stacks provide security and energy
The smoke stacks serve as an exhaust for an open fire, and can also be used by hunters to smoke their catch: caribou, seal, and rabbit. The smoke stacks also function as a light-house. The sheds are sited for the most part on flat land along the coast or can be floated in Foxe Basin at the northern end of Hudson Bay; thus, the smoke stacks are visible from afar and suitable for attaching lights, antennae, and other communication equipment. In the short summer, solar panels are installed on the smoke stack and the shed roofs to cover the modest energy needs. At the same time, as much energy as possible has to be stored for the long, dark winter. Evaluations are currently being made to identify the most suitable storage method. At any rate, the angles of the smoke stacks are crucial for solar energy, and they have been designed to catch the rays even when the sun is very low in the sky. In an ideal future, snowmobiles will run on electricity and the sheds will serve as electric fuel filling stations. Naturally, rainwater and snow are systematically collected and treated so that there is always enough water for drinking, cooking, and washing.

Dialog with the locals
Apart from fulfilling practical, everyday functions, the AFN hubs are also planned as places of meeting and exchange. From the beginning White and Sheppard have sought dialog with the Nunavummiut. This has resulted in close collaboration with Nunavut’s Department of Culture, Language, Elders and Youth (DCLEY), which is interested in promoting the local language and culture. White recounts that initially they were met with a great deal of skepticism. “But it would have been unusual if there had not been any skepticism. Every project from the South is met with skepticism – and with good reason, for in the past the North has received a lot of bad advice from the South.” However, this mistrust is slowly being broken down. A representative of DCLEY was also present at the ceremony in Washington DC at which Sheppard and White received their Holcim Awards Gold 2011 North America. “That made us incredibly happy,” says White, “since it confirms that we are on the right path. We have to succeed in convincing the young generation that there is much in their traditional culture that is worth celebrating. Collaboration is essential for this. We still have a lot of learning to do about this unique context and culture.”

Landscape as inspiration
That Sheppard and White’s interest in architecture goes beyond buildings to include communities and the interplay between building and landscape is explained by their backgrounds. It could be said that architecture was Lola Sheppard’s destiny. Her Belgian grandfather and her Canadian father were architects. Born in Montreal, she studied at McGill University and worked with Erik Van Egeraat in Rotterdam, Jean Nouvel in Paris, and Long & Kentish in London. Her main interest even then was the relationship between public buildings and their environment. While completing her studies at Harvard University she met Mason White, a fellow student. He grew up in North Carolina and studied at Virginia Tech in Blacksburg in the Appalachian Mountains. “It was a phenomenal place to study the relationship between architecture and nature,” he says. Olivio Ferrari founded the College of Architecture and Urban Studies at Virginia Tech. The Swiss academic also developed a study-abroad program in which White took part, spending a year in Riva San Vitale in Ticino. After their studies White and Sheppard worked in London, before settling in Toronto.

Thinking outside the box
2003 was a turning point in the careers of the two architects. That year they took part in three competitions. They won one, were placed second in the next – an enormous landing stage for Mississippi ships in Memphis, Tennessee – and received an honorable mention in the third. Encouraged by this success, they branched out on their own and founded Lateral Office. Thanks to a number of teaching assignments, they have been able to concentrate for the most part on experimental, conceptual design. Aside from installations that explore the interactive relationship between people and architecture, the two have also designed several temporary and experimental gardens. “The combination of academic research and design-oriented practice means we are able to conduct detailed studies of extremely experimental questions,” White explains. “In our field there are many attempts to approach topics in much the same way as the conditions for the Holcim Awards competition are defined. The question is: What can architecture achieve over and above its conventional functions?” He maintains that from the moment a building is given a name, the train of thought leading to its construction leaves the station: “The word ‘library’ immediately triggers visions of bookshelves, new-books stands, and check-out desk – and your thinking is already gathering speed along the conventional path. Separating the design from the term used for a building gives us liberties. This is the purpose of lateral thinking. By thinking beyond the terms we access the opportunities that lie between the categories.”

“It is important to remain flexible!”
For the moment the AFN is still on the drawing board. If everything goes according to plan, the first prototype shed will be standing by the beginning of 2013. After that the focus will be on collecting data about the use of the shed in practice and its impact. “We are still at the first stage,” White says. “It is important to remain flexible and to examine new insights and issues in a dialog with the future users.” The Holcim Awards recognition ensures that the work will continue. “It is kind of lifelong,” Sheppard remarks. “As an immediate benefit, the funding allows us to visit the North far more often for on-site research and exchange. Above all, though, the prize will help us raise further funds.” Aiza Chaouni, a good friend of theirs, won the Global Holcim Awards Gold in 2008: the prize gave her project an enormous boost. “This example shows us what such an award can do!”

In the regional phase of the 3rd Holcim Awards competitions, this project was awarded Gold in North America. See page 128.
“The question is: What can architecture achieve over and above its conventional functions?” Lola Sheppard
Fresh air and daylight

Most classrooms in California are over 25 years old and in desperate need of modernization or replacement. Architects Gloria Lee and Nathan Swift have risen to the challenge: a sustainability concept for a public school that is easily replicable and economical to build.
“The American Dream” – for Gloria Dongeun Lee this simply means “The dream that everybody gets a good public education.” The architect knows how important this dream is. Her family moved from South Korea to Los Angeles when she was 13 years old. To ensure that their daughter was in a school district with a good public school, the Lees had to move house a number of times.

Architecture as calling
Born in 1966, Gloria Lee wanted to be a doctor. “When I enrolled at the University of California at Berkeley as a pre-med I had no idea what architecture was,” she says laughing. But she did know that she was not happy studying medicine. She envied a fellow student studying architecture who had seminars in social studies, art history, physics, and mathematics. However, Gloria Lee’s parents would not hear of their daughter changing her course of study. Without further ado the young woman packed her rucksack and spent the next 14 months traveling around the world. Today Gloria Lee remarks that this trip influenced her outlook as much as her studies. Back in California she was more convinced than ever that architecture was right for her. Eventually, she got her BA in Architecture at the University of California at Berkeley and her MA at Harvard. There she met Nathan Swift, who is four years younger than her. He grew up in Chicago, the city of architecture, and knew at an early age that he wanted to be an architect. One thing the two students had in common was their admiration for the pioneering and humanitarian concepts of R. Buckminster Fuller, a visionary US architect. “His whole philosophy is based on the principle of finding ways of doing more with less,” Nathan Swift recounts.

New millennium, new outlook
After graduating, Nathan Swift stayed on in Boston and worked in the studio of Kimo Griggs, his former professor. There his main task was building prototypes: “You dirtied your hands; I liked that,” he says. Only later did he join his partner in Los Angeles. Nathan continued to pursue his interest in bridging design and construction at the design-build firm Marmol-Radziner and Associates in Santa Monica, California, where he was a designer for four years. On the other hand, Gloria honed her skills first at Mark Mack Architects in Venice, California, and later at a large corporation, DMJM/AECOM gaining experience in the design of public buildings and larger commercial projects. Increasingly, after their working day ended, they put in another shift at home on their own projects. In 2000 they took the plunge, became independent professional architects, and founded their own architectural office: Swift Lee Office (SLO). Lee applied for an Oberdick Fellowship at the University of Michigan. “The time in Michigan fundamentally influenced our way of thinking,” the architect says. “I saw the rusty industrial landscape of Detroit close up and recognized its potential.” Everywhere threw up questions: How can you meaningfully convert factories? What can you do with the steel lying around here? “On the doorstep of the Information Revolution, we need to imagine new potentials for the waste products of the Industrial Revolution. How can one produce something new and original out of the industrial detritus for the next millennium? One way, we believe, is to discover unimagined uses for exciting technologies and common everyday materials. This is a definition of innovation: to see something old in a new light. So many ideas incorporated into our public school project have their origins in this thinking.” Although for the time being the two had little opportunity to put their bold ideas into practice, they gradually put out their feelers toward bigger projects.

School crisis in Los Angeles
To find appropriate assignments the two architects took a greater interest in their com-
Community. For example, Lee was elected to the Lincoln Heights Neighborhood Council—a citizens’ forum with the object of simplifying communication between authorities and the population. Here she established contact with the administrator of a charter school. Charter schools are for the most part smaller schools founded by private initiative that provide an alternative to other public schools; they are, however, part of the public education system. This led to the first small commissions for re-models and enhancements. As a result, Swift and Lee began to explore school buildings, and they realized that this field was full of challenges for architects. The situation of the Los Angeles Unified School District (LAUSD) was anything but rosy. With 700,000 students between the ages of five and 18, Los Angeles is the second largest school district in the USA after New York. However, the district’s budget has always been tight, and because of the difficult economic and political environment it has become even tighter in recent years.

Small classes, huge shortage of space
Since 1997, the LAUSD has undergone a USD 20 billion voter-approved transformation. While the massive new-construction and modernization program added thousands of new seats, it did not, however, address the ever growing demand for charter school facilities or provide a permanent solution for replacing an aging stock of inefficient portable classrooms. A few years ago the insight that smaller classes improve teaching led to a systematic reduction in the number of students per class. The flipside of the coin was the need for more classrooms. The cheap instant solution was to set up portable classrooms between existing school buildings. Aside from the fact that temporary premises of this nature get rundown very quickly, they also take up a lot of space and look shabby, which is hardly conducive to learning. In short, the premises of many schools in Los Angeles are in urgent need of complete refurbishment or even replacement. Yet there was hardly enough money to achieve even the targeted level of teaching. To do something about this desolate situation, enterprising new LAUSD Chief Facilities Executive James Sohn initiated a competition for a design for a classroom building that could one day replace the 9,300 temporary classrooms. The replacement structures should be economical to produce and put up, yet still offer a pleasant learning environment.

Far-sighted school authorities
As a rule, in California only architectural offices that have already taken part in at least five comparable projects in California may participate in such competitions. However, unusual circumstances worked in favor of SLO. This last round of the building campaign had already taken place on the basis of the conventional criteria, but the LAUSD felt that the results were too conservative. So the LAUSD initiated a second round in which it suspended its own stringent requirements and instead announced an open competition in the hope that this would encourage young architects with bold new ideas to take part. “We immediately grasped the opportunity,” Gloria Lee explains. “It meant that all that we learned from our charter school experience could be put to good use.” The school agency was looking for a prototype for a sustainable, flexible, easily reconfigurable and programmatically diverse learning environment that was suitable for a broad roll-out. The challenge exactly fitted the goals that Lee and Swift had set for their architectural office: “As we look to the sustainable future, we are challenged to think differently about how we practice sustainable architecture and we saw great potential in customizable prototype design and in solving repetitive problems such as school design.”

Three solutions
So they entered the competition. There were two categories in the competition: a 600 m²...
“We liked the fact that the project was for charter schools.”
— Gloria Lee

Flexibility is everything
Swift and Lee’s winning project – officially called NZE K-12 High Performance School Prototype – looks like a shoe box with an iron frame placed over it. It is a highly flexible design comprising two independent structural systems: A pre-engineered metal building shell and a reconfigurable interior mezzanine. As such it accommodates a variety of uses, spatial configurations, and site conditions. The boxlike, two-story inner building has a steel frame and very simple design. The “construction kit” of pre-engineered components contains as few different parts as possible. This reduces building costs. The modular system allows the interior to be flexibly reconfigured and partitioned as required. The structural bays are not welded together, but connected by bolts, which facilitates rapid alterations to adapt to different programmatic demands. The panelized wall system consists of boards made largely of recycled products. Wherever possible, the surfaces are left in the untreated original condition. Additional materials include felt and wood, which offer aesthetic, acoustic, and haptic advantages over and above their actual function. The SLO educational building can accommodate 350 students under conventional conditions, and up to 500 if necessary.

Second skin
The steel cladding around the upper story of the building carries the “outer skin” or exterior solar wall of the building. By acting as a solar, thermal, and acoustic control, it ensures that the building achieves net-zero energy usage. The modular panels of the solar screen are easily mounted on the frame using hooks and struts. These panels are made of different materials, depending on the circumstances: the possibilities range from bamboo to recycled plastic to wood. The vertical space between the outer and inner façades serves as a ventilation chimney. The two authors have placed particular emphasis on reducing energy consumption. Swift and Lee’s simple strategy is “daylight, daylight, daylight!” The architects’ goal is to ensure that most classrooms use artificial lighting only on heavily overcast days. To allow for generous window surfaces the rooms in the prototype building are unusually high. The ventilation of the classrooms should
also be as energy efficient as possible. The NZE prototype utilizes innovative light and ventilation chimneys to bring daylight into the interior spaces and to drive natural ventilation. Ventilation is driven by thermal buoyancy: as warm air rises naturally through the chimneys it pulls cooler air in from the exterior windows. The chimneys also serve dual purpose as an exhaust system for the displacement induction active chilled beams during heating and cooling modes. Once again the architects’ solution is very simple: fresh air by opening the windows – something the architects believe is done far too seldom in California. The little energy needed to circulate fresh air is supplied by photovoltaic panels on the roof. In contrast to many buildings in the USA in which air conditioners pump cool air into rooms near the ceiling, here the air is blown into the classrooms at floor level. This hugely increases efficiency.

The building as teacher

Naturally, NZE K-12 has not been designed with only functionality and energy efficiency in mind. “We must not forget that children are here to learn,” Lee remarks. “And learning is much easier in a bright, friendly, inviting environment.” For this reason the outer skin is an active ‘learning’ wall and can be visually enhanced and adapted to the users’ wishes and needs with screen printing. In this way Swift and Lee hope to realize the “third teacher” concept of pioneering educationalist Loris Malaguzzi. According to his theory, children’s first teachers are the adults in their environment, the second teachers their peers – and the third teacher is the environment. Swift comments: “We hope that the students will learn something from building that enhances their lives, even if only the awareness that you don’t always have to switch on the air conditioning, sometimes it’s enough just to open the window.” Lee and Swift also dream of writing an entertaining manual to explain how their school building functions: “There are product instructions for everything,” Lee chuckles, “just not for buildings. We thought, ‘Why not?’ We should do something about this!” A manual would also be useful if there is a broader roll-out of the prototype – perhaps even beyond the borders of California. The school building can also be disassembled very quickly and the modular system facilitates the recycling of individual components. Hence, there are no limits to the design’s ubiquitous – and programmatic – application.

“Learning is much easier in a bright, friendly, inviting environment.” Gloria Lee

Preserving culture and beauty

“What does sustainability mean to me?” Gloria Lee repeats the question thoughtfully, before venturing an answer. “Determining sustainability is extremely complex”, she explains. “It is not only a question of measurements and calculations. It is very possible that a large factory can make a specific building product more cheaply and at first sight more sustainably,” she says. “But on second sight you sometimes suddenly notice that others suffer damage as a result; perhaps the profit that the factory makes does not flow back into the local economy. Or perhaps mass production of a specific good results in the loss of a local tradition. Sustainability means preserving quality,” Lee concludes. “But sustainability also means preserving culture, human energy, and the natural cycles. Ultimately, sustainability implies nothing less than preserving beauty and life as such.”

In the regional phase of the 3rd Holcim Awards competitions, this project was awarded Silver in North America. See page 130.
Highly functional attraction

As a rule, border control stations do not win contests for aesthetics. Julie Snow and Matthew Kreilich’s design for a land port of entry between the United States and Canada, however, has achieved the rare feat of combining supreme functionality with elegance – and incorporating a high degree of sustainability.
Julie Snow and Matthew Kreilich.
Van Buren is one of those places at the back of beyond – shortly before you reach the sticks. The town calls itself “The Gateway to the St. John Valley and Canada.” Above all, though, it is the gateway to pristine nature. Surrounded by forests and green fields, Van Buren stretches along the western bank of the impressive St. John River. When they visited this project site for the first time, Julie Snow and Matthew Kreilich were overwhelmed by the beauty of the landscape. “How wonderful – and 8.5 hectares just for us,” Kreilich rejoiced. Julie Snow added: “In places like this you simply love your job!”

Outdated and not fit for purpose

After the terrorist attacks of September 11, 2001, the US General Services Administration (GSA) gave increased attention to crossings located along the northern border, which as a rule tended to be neglected. The GSA is the US Federal Agency responsible for construction and maintenance of federal buildings, including Land Ports of Entry. Some of the terrorists involved in the attacks had entered the USA from Canada. The GSA recognized that these under-utilized border areas were much more attractive for people entering the country with criminal intentions than other border crossings, as these ports of entry were often very remote, outdated, and not fit for purpose. As a consequence, the GSA allocated a substantial portion of its budget to rehabilitating the border crossings. Additional impetus for the modernization program was provided by the American Recovery and Reinvestment Act (ARRA) announced by President Barack Obama shortly after he took office in 2009. This act provided substantial funding for the modernization of public infrastructure – and the creation of jobs. The reconstruction and redesign of the Van Buren port of entry facility is one of the projects that has benefited from the ARRA program. The original border post was designed in the 1950s to be operated by two officials. Now, up to 20 officers are stationed at the border crossing, working out of temporary trailers since the original structure was irreparably damaged by flooding in 2009.

“Have elements serve several functions, all integrated into a whole.” Julie Snow

“It would be difficult to find a more progressive client”

In August 2009 Julie Snow Architects received the commission for the new building. By the following March the project had successfully completed all the planning stages. The start of construction was delayed by problems with the purchase of land, but ground was broken in June 2011. The completion of construction is scheduled for early 2013. On average it takes seven years to complete a GSA project; in Van Buren the process will take half the time – and the project is likely to stay within its budget of USD 30 million.

Matthew Kreilich gives the client credit for the smooth process: “People often express sympathy on learning that you are working for the federal government. They see you in a constant battle with bureaucrats and regulations.” Here the opposite was the case: “It would be difficult to find a more progressive client than the GSA. The agency was extremely active and constructively involved in the design process.” A particular advantage was the GSA’s Design Excellence Program, which provides for regular discussions of plans with peer reviewers, all of them first-rate, independent professional colleagues. “The three peer reviewers for this project were on the same wavelength as us,” says Snow. “The result was an extraordinarily creative exchange.”

Balance between pragmatism and high ideals

Not only architects were involved in this process. While the architects sat around a table in the center of the room, the client’s representatives and Customs and Border Protection representatives huddled around them. Other experts for various aspects of the engineering and sustainability joined them. Sometimes there were 60 people in the room. “That could have been a nightmare,” says Kreilich, “but it wasn’t.” In his view, the large number of voices is one of the most interesting aspects of Design Excellence Program projects. “Certainly you have to be able to manage and filter what is said. But you know that everybody in the room only wants to help. The architect receives support and encouragement every step of the way.” Thanks to the close collaboration, it was possible to convince the building’s users, who until then had expressed little interest in the design, that a good plan can balance pragmatism and high ideals. In general, according to Kreilich, the goals of the GSA’s Design Excellence Program are similar to those of the Holcim Awards competition: “The object is to introduce the idea of sustainability to as broad a spectrum of projects as possible. This also takes into account a project’s social, cultural, and economic consequences.”

From start to finish

As a young woman, Julie Snow, born in 1948, decided on her future profession while doing the dishes. A school friend of her father’s, the architect John Dinkeloo, was visiting. He had just returned from a business trip to England. “Architecture would be something for you,” my mother suggested. “It’s a great life: traveling around the world and building all these remarkable buildings!” Deeply impressed, Julie Snow attended a presentation of the legendary Bachelor of Architecture Program at the University of Colorado and immediately enrolled. Only three months later did the university realize that she had not sat the entrance exam. In the meantime she had learned enough to pass it retroactively. After completing her studies she stuffed her portfolio into her backpack and flew off to Europe. There, she found jobs in architectural offices, first in Seville and then in Athens. Back in the USA she ended up in Minneapolis, where she founded her own architectural office 17 years ago. Before that she worked for a number of years in larger companies, where the strict division between design and production always...
"Introduce the idea of sustainability to as broad a spectrum of projects as possible."

Matthew Kreilich and Julie Snow
irritated her. In her own office things would be different: “I want to accompany a project from start to finish,” she explains. And that is the precise reason why he joined Julie seven years ago, Matthew Kreilich takes up the story. He, too, had had enough of working in larger firms. “In a small firm everybody works toward the same end. The focus is on architecture, not office politics.”

From the Mayans to Modernism

38-year-old Kreilich grew up in the metropolitan area of Minneapolis-Saint Paul and studied architecture at the University of Minnesota in Minneapolis – where Julie Snow, who taught here for 12 years, supervised his master’s thesis. Even before he completed his degree he received an offer from Leonard Parker Associates, for which he worked on some large projects in Seoul. He then won the Ralph Rapson Traveling Study Fellowship, which includes USD 12,000 in prize money. For almost three months he traveled from the Yucatan through Guatemala, Peru, and Argentina to Brazil – an architectural trip from, as it were, the Mayans and Incas to Modernism. Looking back, he recalls: “What really impressed me about modern architecture and the architecture of the Incas and Mayans was the subtle, almost poetic, but extremely practical way in which location was linked with architecture.” Like Snow some years earlier, Kreilich then worked for HGA and was a member of the team that directed the extension of the Walker Art Center in partnership with Herzog & DeMeuron. Finally, seven years ago, Kreilich realized his long cherished ambition of joining his former teacher’s office. Today, the two teach in tandem, most recently as visiting critics at Syracuse University in upper state New York.

Masses of conditions

Compliance with strict security regulations has priority in the Van Buren project. For instance, enhanced visual surveillance allows operational security at the border station at all times with as few as two officers on duty. At the same time, the officers should not feel that they are sitting in a fish bowl. Furthermore, the building must comply with the regulations of the US Energy Independence and Security Act. This act is a series of complex standards and measures introduced by Congress in 2007 to improve energy efficiency in the public operating environment. In addition, the facility had to meet architectural guidelines that Senator Daniel Patrick Moynihan drew up in the 1960s for federal buildings, one of which requires them to provide visual testimony to the “dignity, enterprise, vigor, and stability” of the USA. Finally, the design had to accommodate an average daily traffic volume of 598 private cars, 49 commercial vehicles, up to 100 snowmobiles, a handful of pedestrians, and the occasional floatplane. Aside from this, the reservations of local residents also had to be addressed: today, potato growing, tourism, and border traffic with Canada are the most important sources of income in the area. At the first meetings with the architects the local residents expressed their fears that the new facility would reduce the amount of traffic passing through the town, which would decrease business revenues. By pointing out that the spectacular facility would, on the contrary, invite foot traffic to stop and stroll around, the architects were able to dispel these concerns.

Smaller area

Snow and Kreilich demonstrated to the client that it made no sense to secure the entire area; the 8.5 hectare long, narrow strip of land along the river once served as a railroad loading depot. The secure perimeter of the border facility now includes only 3.8 hectares; the rest of the area is more akin to a public park, with landscaped elements, snowmobile and walking paths alongside the roadway. This reduction makes it easier to comply with a number of the security requirements. On the US side of the border the entry and exit now runs along the river, offering a beautiful view:
the USA presents itself from its panoramic side. The border control station covers almost 4,000 m² and includes three single-story pavilions with checkpoints, office, warehouse, and other premises. One of the major challenges was to design the structure in accordance with the principles of sustainable architecture. The buildings have to be occupied at all times; the important zones must be permanently illuminated by raised light fixtures. The architects entertained the possibility of a net-zero energy goal, but this would have required additional funding. However, the current design reduces purchased energy from the national standard by 48 percent, which can ultimately be increased to 100 percent – in other words, a net-zero energy facility is a long-term possibility. Today local production of biodiesel covers just 20 percent of needs. As soon as this rate is increased, the generator and boiler system could operate on biodiesel alone. Hot water is solar heated and most of the site lighting is provided by LED lamps that are sensor-controlled wherever possible. Thanks to these measures, the facility is certified LEED Gold by the US Green Building Council.

A center of dialog

To comply with the requirement of uninterrupted sightlines the main work areas are largely clad in glass. A silk screen pattern on the glass provides both camouflage and glare protection. Pillars, beams, trees, and posts around the facility also serve to embed it in its environment – a visual echo of the surrounding forests. The glass cladding mirrors the constantly changing colors in nature. In combination with the warm colors of the interior design, this creates a feeling of warmth and openness. In addition to glass, anodized aluminum panels in three carefully selected tones, from very dark bronze to black, were used for the exterior walls. In addition to their aesthetic effect, the varied tones of the panels have a pragmatic benefit, making it easy to replace panels without concern about matching colors. Snow: “The lines of the building, tens of meters long in the middle of the landscape, are intended as an anchor for Van Buren. Through the glass, people can see the warm colors of the interior of the building. This creates a dialog between the station’s serious function and the goal of welcoming people to the country. At the same time, there is also a dialog with the landscape. The building stands out against landscape, but also fits into it.”

Everything is linked together

Because of heavy snow and rainfall, the open checkpoints are protected by a broad canopy, extended beyond the dimensions required to provide cover for officers moving from one building to the next. The pavilions are embedded between birches, marsh grass, mounds, and drainage swales. One problem with this kind of building is disposing of dirty water. In Van Buren the problem is compounded by the town’s stormwater runoff, which up to now has flowed in pipes below the border station property with outflow directly into the river. Now all of the runoff will be channeled and filtered by natural means – another huge advantage in respect to sustainability. “This illustrates our intention of having elements serve several functions, all integrated into a whole,” Snow explains. On the site, grasses and a series of landforms alternate with swales that slow the water and encourage infiltration. What water remains is directed into a major swale that runs along the roadway. The major swale – composed of slate lining interspersed with native planted check dams – further slows and filters the water, directing it into a holding pond, before any of this runoff flows into the river. The topography created by the system subtly forces people to follow the prescribed route when crossing the border – if they do not, they inevitably get stuck. Thus, in this project sustainability also serves security.

In the regional phase of the 3rd Holcim Awards competitions, this project was awarded Bronze in North America. See page 132.
Tragedy as opportunity

It is a truism, albeit sometimes a cold comfort, a disaster always brings opportunities in its wake. Architectural office Elemental interprets this adage in their unique way. Their master plan for the reconstruction of the Chilean port of Constitución after it was destroyed by a tsunami produces not only a new, but also an enhanced urban space.
Alejandro Aravena.

Behind the forest the new city will be more densely constructed: the former small-scale structures are not going to be rebuilt.
“You always have to be open to the possibility that you are wrong.”

Alejandro Aravena
The port of Constitución lies at the mouth of the Rio Maule on Chile's Pacific coast. The city’s roots go back to 1578. Numbering some 45,000 inhabitants, Constitución owes its relative prosperity to forestry and cellulose production. There are also some important mines in the vicinity. Constitución hit the world headlines after February 27, 2010, the day on which Chile was hit by a magnitude 8.8 earthquake, one of the most powerful ever measured. Its epicenter lay just 60 kilometers south of Constitución. The earthquake was followed by a gigantic tidal wave and countless aftershocks. The total number of fatalities is put at almost 600, and about two million people were directly affected by the catastrophe, which destroyed or badly damaged hundreds of thousands of homes. The total cost ran to about USD 30 billion.

Constitución was hit particularly hard: the tsunami destroyed large sections of the city close to the coast and killed numerous people who could not flee in time. The hospital had to be evacuated, so that first responders reached the devastated areas only after a considerable delay. In those dark days, older inhabitants of the city were reminded of an earlier catastrophe: almost 50 years earlier. On May 22, 1960 an earthquake and the ensuing tsunami also destroyed large parts of the city. To date, the Great Chilean Earthquake or Valdivian Earthquake is the most powerful ever recorded, with a magnitude of 9.5.

90 days to produce a master plan
It was clear that it would take a lot of money, energy, and expertise to rebuild the city after the tsunami of 2010. The state also appealed to private firms for help — and asked a forestry company that operated in Constitución whether it would be willing to support the reconstruction. The company commissioned Elemental in Santiago to draw up a new master plan for the city in 90 days. Elemental is a for-profit enterprise with a social focus. It works on projects in the fields of infrastructure, transportation, public space, and housing. Shareholders include COPEC (Chilean Oil Company) and the Pontifical Catholic University of Chile. Architect Alejandro Aravena has been Elemental’s Executive Director since 2006. A former visiting professor at Harvard, he currently holds a professorship at the Pontifical Catholic University.

“We use our projects to extend the advantages of urban living to all.”

Alejandro Aravena

Don’t wallow, act
Elemental calls itself a do tank — in contrast to a think tank. “We love reality,” Aravena says, “and we like to act. You recognize good ideas within two seconds; either you have them or you don’t. We don’t waste time on detailed diagnoses, but search immediately for solutions. In any case, the problem is usually obvious. We don’t necessarily have the expertise for every commission, but we have common sense. And we also know how to talk to people. If you use technical jargon, nobody understands you. The art is to talk simply, without denying the complexity of the problem. You don’t have to dwell on details all the time. You just need to be able to say in a few sentences: We are doing this and that in this or that way for this or that reason. That is how a do tank functions!” It was this attitude that qualified Elemental to quickly develop a master plan for Constitución.

“Beforehand we had never worked on commissions of this kind. But the fact that we were outsiders also had its advantages: It meant we could ask dumb questions and look at things without prejudice. So we agreed among ourselves: We just have to summon all our knowledge and years of experience and let ourselves be guided by our professional intuition.”

Schools have absolute priority
Alejandro Aravena is convinced that the deadline for developing a master plan was so short because a private company commissioned it: “If government offices had been involved at the beginning that would have taken a lot more time.” And time is precisely what was not available: in South America we were heading into winter. “There was nothing; the infrastructure was completely destroyed,” the architect explains. The do tank immediately sought contact with the population whose world had just collapsed and now had to be rebuilt. Aravena: “If people are worrying about where they will spend the night, they have little interest in thinking about the medium- or long-term future of their city. At such times it is crucial how you present people with options. This is not the time for abstract debates. We sat down with the people and told them: ‘We have to recreate the entire city. But you know far better than us what you need. Where should we begin?’ It was soon clear that the school had the highest priority — not because parents thought that teaching would be really good for their children at this time, but because the school provided meals for the children. “And because it would be a sign of normality when the children could return to school,” Alejandro Aravena adds. Other priorities included the hospital, shops, and the bus and railway station, “because when people come back to shop in the city, the residents can earn an income again and take charge of their own lives.” It may surprise outsiders that accommodation was not the main priority for the people concerned, but as Aravena knows: “After a disaster you have far more important things in your life to worry about than the fact that you have to rely on other people for temporary accommodation.”

Threefold strategy
Within a few weeks Elemental had developed a plan to ensure the long-term survival of Constitución. Aravena explains: “Chile already had a lot of good earthquake measures. Most structures are built to code, which is why the number of victims even in strong earthquakes is comparatively small. However, little has been done to prepare coastal cities for tsunamis.” The objective of the members of Elemental was a strategy to mitigate the effects of a tsunami. The plan that won them a prize in the Holcim Awards competition is threefold: an evacuation scheme, a forest to mitigate the impact of the tsunami, and better organization of districts close to the coast. The combination of these three strategies allowed the city to be reconstructed as closely as possible to where it had always stood: next to the sea and the river.

“Large construction companies offered to throw up a few thousand apartments beyond the city limits. But that would not be sustainable. The people work in the city, and we wanted families to stay where they had their networks.”

15 minutes to safety
The evacuation plan measure is crucial to restoring people’s confidence in their familiar environment. “Fifteen minutes after a tsunami warning, every inhabitant has to have reached a safe place,” says Alejandro Aravena, “a place where the tsunami will not have a fatal impact because it will arrive with less energy and bearing less debris. Water alone will not kill you — what is life-threatening is all the material that the tsunami carries along with it.” The object was to guide the flight of the endangered population along routes that would allow them to escape quickly — and to remove all possible obstacles from their path. The new quarter bor-
dered by the Pacific and the river will therefore have three wide streets – Rosas, Crux, and Pinto – that run at right angles from the river to safe zones in the city. These areas lie at least ten meters above sea level and out of reach by a tsunami. The entire quarter is divided into blocks so that the residents can reach the flight routes quickly and without obstruction. All the flight routes will be illuminated by solar lighting and well signposted. There are also plans to install an alarm system so that everybody can hear the evacuation announcement.

**Trees to break the impact**
The second measure of Elemental’s threefold plan is a forest along the coast and river bank. The team expounded the forest concept to two different teams of experts, and both confirmed the thinking behind it: a forest is a suitable means of containing the force of a tsunami. Aravena: “We also had empirical proof. Offshore from the city is a forested island. It suffered far less damage than Constitución itself. An investigation revealed that the waves release between 30 and 40 percent of their energy as they sweep through a forest.” But will a forest grow fast enough to provide enough security for Constitución in the medium term? Alejandro Aravena responds: “Of course you can put up a wall faster than plant a forest – but a wall will never protect you! Artificial constructions cannot withstand the force of a tsunami.”

**A protective barrier as park**
Fortunately, trees grow very fast in the region around Constitución – which is why it is a center of the cellulose industry. In 20 years you have a forest. Elemental worked closely with the university to choose the appropriate trees; in the meantime they have decided in favor of a species of indigenous pine. “In response to a geographic threat we propose a geographic answer,” Aravena comments. Apart from protection against the full force of the tsunami, the forest zone along the river has other advantages for Constitución, for example a park in the most beautiful location. “A tragedy is always an opportunity too,” Alejandro Aravena reminds. “The park has opened up the city to the river, providing public access to what the community sees as their real identity.” The forest improves the quality of urban living to the advantage of all. It also triples the amount of green space in the city from the previous meager 2.2 m² per resident to 6.6 m². In addition, the forest serves as a retention basin in times of flooding, which previously was an annual occurrence in areas along the river.

**Compromise is unavoidable**
Because no housing is going to be rebuilt along the bank of the river, the remaining residential space must be better utilized through denser building. The third component of the threefold strategy relates to the rebuilding in the quarter. The residential buildings will be a little higher and they will stand on pier-like
structures; a tsunami will cause much less damage if it can rush through under buildings on stilts, so to speak. The new design plan for the quarter contains innumerable details that now have to be put into effect individually, in many cases after further improvement. “You always have to be open to the possibility that you are wrong,” Aravena remarks. “We constantly question what we are doing; it prevents us from taking a blinkered approach to our work. For instance, a major problem frequently cited in Constitución was ‘You are always talking about improving the quality of our living space, yet we have a cellulose plant in the middle of the city that causes massive pollution.’” It would appear logical to move the factory out of the city. The plant was built half a century ago as a state enterprise. At the time it was felt that a factory should be as close to the port as possible. Nowadays the plant would be built close to the forest. However, if the plant really did move out of the city it would be rebuilt close to forests at a great distance from Constitución. Aravena is convinced that “Deprived of its raison d’être, the city would also disappear. Consequently, the factory must stay in the city – but we have to do something about the emissions immediately.”

“Would I want to live here?”

All the plans and concepts that Elemental developed had to be approved by the government bureaucracy. It took months to discuss the budgets and draw up calculations for all the details of all the plans. “The money is finally there,” Alejandro Aravena says, “but the experts are still on site doing sums. We are talking a lot of money: to set up the park we have to buy private property.” Of course the state could simply expropriate the land to implement the plan, but such a procedure would not be opportune in the present situation. Aravena knows that “The people have to back the project. We depended on strong public and political support for our project. We have received it, and now the project can go ahead.”

The architect thinks that the Holcim Award for Elemental’s strategy will facilitate project implementation. “Any confirmation that our project is a good thing helps us at the political level. Word then gets about: Hey, these guys are right!” But ultimately, the most important factor for architects is not necessarily the perception of outsiders, but the architect’s own appraisal. “The ultimate test for our proposals is always the question: ‘Would I want to live here if our plans are put into effect?’ in the case of Constitución I can answer this question without reservation in the affirmative. You are not often asked to develop an entire city, which is why I am happy that we have found such good solutions for Constitución.”

In the regional phase of the 3rd Holcim Awards competitions, this project was awarded Silver in Latin America. See page 150.
Step by step

In the Mexican border city of Ciudad Juárez the quality of life of many inhabitants is very poor. A master plan proposes upgrading public spaces in the informal northwest sector of the city. The authors of the plan forsake large-scale intervention in favor of a pragmatic strategy of small steps.
Saidee Springall and Jose Castillo.
“Juárez is the perfect place to achieve change in small steps.” Saidee Springall

Statistically speaking, Ciudad Juárez is the most dangerous city in the world. Nowhere is the Mexican drug war fought as brutally as here on the US border: seven people on average are killed every day within the city’s boundaries. Yet not even the worst reports have managed to reduce the stream of people pouring into Ciudad Juárez in search of work. Since Mexico signed the North American Free Trade Agreement (NAFTA), Ciudad Juárez has been one of the fastest growing cities in Mexico. The metropolitan region now numbers about two million inhabitants. Because labor costs are lower on the Mexican side of the border than in the USA, a string of so-called maquiladoras have sprung up in the region. These plants assemble components into finished products, mainly for US, European, and Chinese companies. The conditions in the maquiladoras are often wretched, yet many rural inhabitants prefer the harsh conditions in the maquiladoras to unemployment in their villages. Many also come to Ciudad Juárez in the hope of crossing into the USA. However, as it is now almost impossible to cross the four bridges between Ciudad Juárez and El Paso on the US side without valid papers, many potential emigrants end up stuck in Ciudad Juárez.

“We are all Juárez”
The population explosion – a tenfold increase in just 40 years – has completely overwhelmed the infrastructure, which is not even remotely adequate. Most new arrivals live in extremely modest circumstances in informal urban developments. These districts are hotbeds of crime; the young people that live here have virtually no prospect of education or regular work, and are thus easily recruited by the drug cartels. Everywhere in Ciudad Juárez it is obvious that something has to be done, and the city authorities are all too aware of this. In response, they have launched the “We are all Juárez” strategy to radically improve the social, economic, and physical conditions in the city. The strategy comprises a total of 160 government commitments, one of which is the master plan for the northwest sector of the city, a particularly poor area with drastic levels of crime. In quarters such as these, people spend a lot of time out on the street, where the infrastructure is rudimentary, with virtually no street lighting for instance. Consequently, the object of intervention in this area is to create public spaces that will improve security, help the local economy, and provide recreational and cultural activities. The intervention is intended to strengthen community networks in this part of town and reduce crime and environmental pollution.

Sustainably social
The city commissioned architects Jose Castillo (born 1969) and Saidee Springall (1968) to draw up the master plan. arquitectura 911sc, the Mexico City architectural office of the husband-and-wife team has a solid reputation in Mexico in the field of sustainable building and sustainable development. “For us sustainability means thinking of the future,” Saidee Springall says. “It is the classical triangle of social, economic, and ecological factors. Increasingly, people associate sustainability with environmental protection, but all three components are important; our particular interest is the social component.” She explains that when people hear the term “sustainable building” many think of smart buildings, but for arquitectura 911sc the main question is how these buildings can address the needs of the community. Jose Castillo is convinced that “Architects, too, have to play their part in helping our society come to grips with their social problems. It is not enough to answer violence with violence. Civil society
must exert itself again, take control, and overcome its fear. Attractive public spaces where people can feel free to move and do things play a crucial role."

People know what they need

Given their convictions, Saidee Springall and Jose Castillo were the perfect experts to draw up the master plan for this sector of the city. The core of the project is the conversion of two retention basins into public spaces — and to develop a new strategy to deal with flash floods after heavy rainfall. One thing was clear to the two architects from the start: the key to success would be the program they drew up for the new public spaces. And this program has to be diverse. "We need a variety of amenities and facilities that cater to different activities at different times," says Jose Castillo. "A bus stop, studios for workshops, sports facilities, apartments, etc. We have to create productive friction: when people meet other people there has to be some interaction. This is how an active society emerges." Thus it is crucial, in Castillo’s view, that a public space fulfills the needs of its future users. "We are not working for people, but with them," the architect explains. "We could adopt an arrogant stance and maintain that the community has no idea what its needs are, and give them what we think is suitable. But people, of course, know exactly what they need."

Pedestrian paths are more important than streets

You obviously have to help people to communicate their specific wishes, for instance by digging deeper. "It is a question of listening, and then correctly interpreting what we have heard." For instance, it turns out that mobility is one of the locals’ major concerns. The people demanded better streets. The architects responded by asking how many locals had a car; it turned out that in this district less than three percent of the people owned a car. "If people want better connections with other parts of the city, better streets would seem to be the obvious solution — but in this case streets would not solve the problem. So we proposed investing our resources in connecting the district to the public transport system and in better sidewalks and pedestrian paths. The people immediately grasped that this was a better solution for their needs."

There’s room in the boat for everybody

Before they drew up the master plan for the public spaces, the architects organized three participatory workshops with the local inhabitants; one of these included a walkabout in the quarter so that the architects could learn first-
“Our work is only one piece in a large puzzle.”

Jose Castillo

hand about problems of this city sector. “We posted flyers inviting people to these events,” Saidee Springall recounts. “And we appealed directly to anyone with a leadership role in the quarter to take part.” Community members whose voice carries weight include teachers and doctors – but also people enjoying an informal position of respect in society. “We were warned against including people associated with drug gangs, but,” Jose Castillo is convinced, “in a project like this you cannot think in moral categories.” We soon realized that the 14 to 19 age group is extremely isolated and, as a rule, largely ignored. “Yet, if you want to combat violence, it is extremely important to bring them on board. You have to recognize them as an active part of the community.” In the end a total of 75 inhabitants were actively involved in the development process.

Football pitches and flowerbeds

The concept that arquitectura 911sc drew up on the basis of the workshops consists of a broad range of interventions. A plaza and temporary market is to be created over an existing parking lot; another complex will provide space for community workshops. A space that currently serves as a retention basin in the event of flash floods will be turned into two soccer fields. Close by is space for a social housing program. A long, narrow bare patch will be converted into a park, and when the second large retention basin is not holding water it can also be used as a park. “We propose an innovative solution for the retention basins,” Jose Castillo says. “Instead of getting rid of the water as quickly as possible, we want it to flow off slowly so as to prevent erosion.” Although the basins cannot be used at certain times, they will not be destroyed by the floodwaters. This protects the project investment.

Neither naive nor euphoric

The recreation spaces are so designed that they can be used by everybody, including children, senior citizens, and handicapped people. The plans envisage playgrounds, a skate park, beds for growing vegetables and fruit, and commercial lots, for example for small repair shops. None of this is spectacular – which is why there is a good chance that the project can make a real contribution to improving the local inhabitants’ quality of life. Ultimately, in Jose Castillo’s opinion, to realize such a project you have to mobilize the available resources and potential. “You’ve got to move beyond excessive naivety and excessive optimism – you’ve got to be pragmatic. The more we accept the world as it is, the greater the chance that we can change it.” Saidee Springall and Jose Castillo make a point of emphasizing their need to be realistic. Because the problems in Ciudad Juárez are so enormous, you must not expect too much from individual measures. Moreover, the developments will take time to make an impact. Jose Castillo is well aware that “many commitments are necessary to reduce the level of violence; our work is only one piece in a large puzzle.” But the two architects are firmly convinced that well-designed public spaces that people can enjoy have a role to play in the fight against violence.

Disadvantaged from morning to night

Every small improvement is a gain for the inhabitants. Saidee Springall repeatedly points out just how disadvantaged people in this sector of the city are. “It is unbelievable how marginalization functions here: there is no local supermarket, so people have to travel 30 minutes just to obtain the necessities of life. They are at a social and economic disadvantage even before they get out of bed in the morning.” The fact that there is no supermarket is a consequence of violence. When shops close down the situation worsens, because shops contribute to security – the more people there are going about their everyday business, the safer the district is. Despite the glaring lack of commercial facilities, nobody wants to open a store in the current circumstances; shopkeepers are immediately hit by protection rackets. “How do you break this vicious circle?” Jose Castillo does not have a ready solution, either. “There are so many different factors! For example, what police you have in a neighborhood plays a role – heavily armed federal guards or local policemen who live in this quarter? The police have to be seen as an integral part of the district, not as a foreign force that everybody is afraid to turn to.”

Perfect place for change

Saidee Springall adds, “You may think that Juarez doesn’t have a chance. But we say that Juarez is the perfect place to achieve change in small steps. Our project is not an attempt to change the whole city. It is a small intervention, a trial balloon for new ideas. If some of them prove successful, they can be pursued further and adapted elsewhere. If they don’t function, we can adjust.” At this point Jose Castillo reveals just how optimistic he is: “Juarez is a border city with enormous potential. In the long run it could develop into a powerful economic center in conjunction with El Paso, the neighboring city on the other side of the border.” He accepts that it still sounds improbable that two such different cities could form a single economic entity. “But there is no question that the potential is there.” That said, recent developments have thrown a wrench in the works. Arquitectura 911sc started working in the project in the second half of 2010 and presented its master plan about six months later. Since then not much has happened: because of a renewed escalation in violence in the city, many interventions have been put on ice. Jose Castillo remains confident. “Such a project may be put in the drawer, but it is not forgotten – the need to do something is as urgent as ever. My experience in this respect has made me very pragmatic.”

Region of opportunity

If the project fails it will not be for lack of funding. Saidee Springall remarks that the problem in Latin America is not the lack of money, but how it is spent. “It is surprising how much money there is in Juarez. But people would, for example, rather invest in a parking garage than in better housing.” And all too often people make do with the easiest solution, rather than look for the best one. There are many examples that demonstrate the importance of quality for the success of an intervention. Jose Castillo talks a while about Medellín. In recent years a lot has been spent on upgrading an informal area of the city on the principle of “only the best is good enough for the poor.” With the result that people are proud of their quarter and accept responsibility for it. Incidentally, the authors of the Medellín strategy received the Holcim Awards Gold 2008 Latin America. “Medellín serves as an important model for us,” Jose Castillo adds. The model confirms his view that “Latin America is a region that offers a world of opportunity. In Paris the last new bridge was built 150 years ago – but here architects still have a lot to do.”

In the regional phase of the 3rd Holcim Awards competitions, this project was awarded Bronze in Latin America. See page 152.
“For us sustainability means thinking of the future.”  Saidee Springall

“We are not working for people, but with them.”  Jose Castillo
Low-tech improvements

Bedouins living in the Israeli-controlled West Bank have few opportunities to improve their difficult lot in life. A visionary team of Italian architects developed a concept for refurbishing an existing school building in a Bedouin community that positively impacts the entire community and complies with the regulations of the occupation authority.
There are few regions in the world where political tensions are as high as on the West Bank. In 1947 the United Nations General Assembly assigned a 5600 square-meter belt of land between Jordan and Israel to a future Arab state. A year later the area was occupied by Jordan, which subsequently formally annexed it. After Jordan was defeated in the 1967 Six-Day War, Israel occupied the West Bank. Today, about 2 million Arabs and 500,000 Israelis live in the territory. Little parts of the territory are administered by the Palestinian Authority, while almost three quarters of the West Bank is controlled by the Israeli army. The status of East Jerusalem, which Israel annexed in 1980, is a particular bone of contention.

Permanently provisional
The inhabitants of East Jerusalem also include Bedouins. Their situation is exceptionally difficult. Because there is no space left for their traditional semi-nomadic way of life, the Bedouins have retreated to a few inhospitable districts. Today the Wadi Abu Hindi community near Ma’ale Adumim has a population of 2,700. Among other problems faced, the sliver of land they inhabit is under growing threat from the spill-over of the expanding settlements in East Jerusalem. In the close vicinity of the Abu Hindi valley are one of the largest rubbish tips in the region and a number of slurry pits. In summer the stink is almost unbearable and most of the land from which the village community wrests its meager agricultural output is heavily polluted. For its – often dirty – supply of water the village depends on a hose that is two centimeters in diameter and repeatedly blocked. As Abu Hindi is not on any power line, a rented generator is its only source of energy. The Israeli occupation force places further constraints on the Bedouins’ quality of life: They may not erect permanent buildings in Abu Hindi or use cement or dig foundations – their villages are viewed as a temporary home.

A metal building in the semi-desert
In 1997 the inhabitants of Abu Hindi decided to build a primary school for their children. As the nomads were not allowed to build a permanent structure for the school and had little experience in the construction of fixed installations, the building with its seven rooms of about 20 square meters each failed to meet even the most modest requirements. For the building the Bedouins used whatever material they could get their hands on, in this case mostly sheets of galvanized iron. This meant that the lessons in one classroom could always be heard next door. Moreover, the metal building got so hot in summer and so cold in winter that it was often impossible to keep to regular school hours. When they learned of this untenable situation the people at Vento di Terra NGO decided to do something about it. The non-
profit organization based in the northern Italian metropolis of Milan was founded in 2006. It has its roots in development work in Palestinian refugee camps and today is active in the educational sector, communal infrastructure development, healthcare and emergency humanitarian relief work in various parts of the world. Vento di Terra also attaches great importance to eco-architecture, or as the organization’s website puts it: sustainable buildings that “reconcile the environment and human activities.”

Upgrading an unchanged structure
In this endeavor Vento di Terra has the support of ARCò Architettura e Cooperazione, a northern Italian cooperative of young, idealistic architects – most of them coming from the University of Pavia. The architects had erected a highly acclaimed school project for Bedouins in Palestine in 2009. They built a school in the village of Al Khan Al Ahmar out of old tires filled with earth. Quick and easy to put up, the unconventional structure is absolutely satisfactory in respect of statics and ambient climate. “Our next initiative was to do something to improve the school in Abu Hindi,” Claudia Romano explains. Born in 1980, the architect is a member of ARCò. She lives and works in Trieste and was also involved in the building of the tire school. Before it could refurbish the school building in Abu Hindi, ARCò had to find an answer to the question: How can we upgrade this school and make it more comfortable without in any way altering its structure? It had always been clear that this building was tolerated only because it was structurally so light. “The Israeli army demanded that we leave the shape of the building as it was,” says Claudia Romano. “So, for example, we were not allowed to enlarge it.” And it was also clear from the start the Bedouins had to do the construction without any outside support, in other words, they had to refurbish the building themselves. ARCò needed to devise a concept that untrained manual workers would be able to follow.

A social meeting place too
The Bedouins were not just to receive a building plan: they also had to play an active part in the development process in keeping with Vento di Terra’s principles that call for the participation of the local population. As the architect says, “The Bedouins trust us. At first they did not believe us that you could build a nice school out of car tires – but the success of that project laid the groundwork for a worthwhile relationship.” Claudia Romano is well-acquainted with the local situation, including the hardships and needs of the Bedouins. Although they are hardly responsible for the conflict on the West Bank they are shoved around with no place that they can call their own. Of course, as Claudia Romano points out, they are fed up with their situation, but there is very little they can do to resist. There are also restrictions on the outside aid they may receive. “We have to focus our support for them on education,” the architect comments. “Education is very important for the Bedouins as it may perhaps open the door to opportunities in the future.” The children who learn Arabic or mathematics in the school in Abu Hindi all live in the district and in some cases have up to an hour’s walk to get to school. However, the school building has an importance for the community that goes well beyond its function as a place of education – it is the meeting place and center for the Bedouin community.

Thicker walls and a new roof
The architects also wanted to demonstrate a fundamental point with their concept for the refurbishment project: “We wanted to show the people that you do not need a lot of money to build something better, you just have to make the best use of the available materials: straw, bamboo and mud bricks.” The Bedouins have

“The Bedouins trust us.” Claudia Romano
used these building materials since time imme-
memorial, but they have lost some of the knowl-
edge about the right way to work with them.
The technical contribution of the ARCo special-
ists focused in particular on two aspects of the
school building: the external walls and the roof.
The first objective was to substantially reduce
the temperature in the classrooms, which could
reach 40 degrees in summer. “We wanted to
shade the metal walls using easily removable
panels that do not alter the building,” Claudia
Romano explains. ARCo opted to design panels
made of bamboo as air can circulate between
them and the metal wall. At the same time the
architects searched for a way to insulate the
walls. They decided to attach a multilayer wall
made of straw and mud to the inside of the
existing external wall of metal sheeting and
plaster it. Although this meant that the indi-
idual classrooms would be slightly smaller, they
would be much better insulated. ARCo’s solu-
tion for acoustic barriers between the class-
rooms was partition walls made of mud bricks;
a wooden floor further enhanced the insulation.
The concept also called for the replacement
of the existing roof of metal sheeting with a sand-
wich panel construction that includes a layer of
insulation. Furthermore, the new roof would be
raised and tilted from north to south to enable
air to circulate. This natural ventilation further
reduces the temperature and improves the in-
doors climate.

Full-scale model near Milan
The refurbishment concept was developed for
the most part in Italy. “Because we were sitting
in Europe, we were constantly peppering our
colleagues on site with questions via email,”
Claudia Romano explains. “What materials are
available? What is the composition of the soil?
Can we get bales of straw?” Finally the ideas
reached the stage where the ARCo members
could move on to the most important phase of
the project: Under a workshop held near Milan,
they constructed a full-scale model of part of
the building. “This allowed us to see what func-
tioned and where we had to make improve-
ments,” says Claudia Romano. The most impor-
tant result of the workshop, though, was the
production of an instruction manual. The
ARCo team had difficulty communicating with
Bedouins whose English and Italian was as
poor as the architects’ Arabic. This prompted
the team to prepare an instruction manual
with plenty of illustrations: every individual
construction step was photographed in detail
and described.

Exemplary solutions
The timeframe for the actual refurbishment was
a relatively tight window of two months during
the school break in the summer of 2010 – the
school was not to be refurbished at the expense
of the children’s education. Eight workers toiled
for six days a week; since all of them lived in the
village, the project also provided employment.
The two working cultures – ARCo’s and the
Bedouins – were not always immediately com-
patible, but, according to Claudia Romano, the
result was always “a cooperation in which all the
persons involved were able to learn from one
another.” Ultimately, the concept proved to be as
successful in practice as in theory: In summer
the classrooms are now about 5 degrees cooler
than outside and there is no comparison be-
tween the former and the current indoor climate
and ambience. However, not all problems have
been solved by any means. It turns out that the
plastering on the interior walls has to be im-
proved as it does not stand up to ordinary wear
and tear. The school also needs a photovoltaic
system to be totally independent. That said,
the school is already a beacon – similar projects
in particularly critical parts of the world need
cheap and easily realizable technological solu-
tions of the kind that the Abu Hindi project
proves are feasible. As Claudia Romano is only
too well aware, “Such projects almost always
come with tiny budgets and poor conditions.
In addition, the window for realizing a project is
often very tight.” The total cost of refurbishing
the school building in Abu Hindi was about EUR
45,000. The funding was provided by Italians –
from Mario Cucinella architects, the Italian
Bishops’ Conference, and towns and cities
around Milan.

Sustainability needs sustained needs
The architects were not paid for their design.
“We are simply passionate about this,” Claudia
Romano assures, “We are not in it for commer-
cial advantage.” She continues that the crucial
point is that they as architects know their pro-
fessional know-how can help people. “Here we
are doing something for the children, and in this
very special part of the world children are espe-
cially important people.” Since it is not easy for
young professionals in Italy to get their projects
built, the members of ARCo are happy to gather
experience through their projects in Palestine.
And anyway, in Claudia Romano’s opinion, archi-
tects ultimately have only one task: to help to
improve the world. “I would like to do something
to ensure that people treat one another, the en-
vironment, and the future with respect. Archi-
tecture is very important as far as the future is
concerned.” The architect interprets sustainabil-
ity in her profession as building something that
causes nobody harm “and improves the way in
which we live and how we use places – for us
and for all who come after us.” Another aspect of
sustainable building is achieving more with less,
in other words getting better results using less
money and less technology. To realize this, it is
indispensable that people understand how proj-
ects affect them. “In my view a project is sus-
tainable if the people are involved in it from the
beginning and have a say. They must have a real,
sustained need.”

One step at a time
According to Claudia Romano, winning a Holcim
Award was a huge surprise for the ARCo team as
“ours is in fact a small project.” She continues
that for the ARCo members the prize confirms
that they are on the right path – “as professional
architects, but also from a human standpoint.
We are doing something that is important. Now
we can grow and do even more!”

The next project is a kindergarten in the Gaza
Strip. ARCo is also continuing its project in Abu
Hindi: A small library is planned for the second
phase. Other plans include building a rainwater
collector out of tires and refurbishing other
buildings. Conditions in Abu Hindi may be very
difficult, but ARCo and Vento di Terra show that
it is always possible to improve the quality of
people’s lives one step at a time.

In the regional phase of the 3rd Holcim Awards competi-
tions, this project was awarded Silver in Africa Middle East.
See page 172.
“I would like to do something to ensure that people treat one another, the environment, and the future with respect.”  
Claudia Romano
About one third of the world’s population lives in structures made of earth. Yet architecture takes little notice of this traditional building material. The design of a German-Austrian-Moroccan team for a school near Marrakesh demonstrates how well earth can be combined with modern technologies and a contemporary architectural language.
Morocco is the most western of the Maghreb states, and not only geographically. Thanks to King Mohammed VI’s long-term economic policy, the country enjoys macroeconomic stability. In recent years the economy has grown between four to five percent a year. Inflows of foreign investment are rising, in particular from large European companies. They are also attracted by reforms that the king had started to introduce before the Arab Spring. Despite success on a number of fronts, Morocco continues to face enormous challenges: poverty, illiteracy, and unemployment are still widespread. To combat these, in 2005 the King initiated the National Initiative for Human Development, a USD 2 billion program to expand, among other things, the electricity network in rural areas and provide more social housing. At the same time the country is investing large sums in its economic future: by 2015 many more billions will have been plowed into logistics facilities at sea and airports.

**Ambitions in the suburb**

Beneficiaries of these projects include not only the booming tourism sector, but also the Moroccan construction industry. Morocco’s biggest construction company is heavily involved in building hotel infrastructure and housing estates: the Groupe Alliances, founded by architect Alami Lazraq. One of the company’s most important projects is Chwiter, a suburb about 15 kilometers from the center of Marrakesh, where it is building housing, schools, recreation areas, and industrial zones for up to 60,000 people. Chwiter is an enormous project that involves a lot of careful planning. One of the bodies involved in the project is a foundation established by Groupe Alliances in 2010: the Fondation Alliances pour le développement durable (Alliances Foundation for Sustainable Development). The Foundation’s purpose is to promote sustainable development in Morocco. In Chwiter it is erecting an institution that is unique in the country: the Centre d’enseignement et de formation aux métiers du développement durable (Training Center for Sustainability). The school will offer young Moroccans training in sustainable building. The Foundation organized a competition for the architectural design – in conjunction with the International Union of Architects (UIA) to attract international attention. Specifications included the space allocation plan, a plot of land of 10,000 m², a budget of USD 8 million, and the use of sustainable building materials.

**Concentrated earth architecture experience**

Among the entries was one from an international team of Germans, Austrians, and Moroccans. The youngest member is Anna Heringer, born in Bavaria, Germany in 1977. In Bangladesh she built a highly regarded school using earth, working with Eike Roswag, a winner of the Holcim Awards Gold 2011 Asia Pacific. The school project won the Aga Khan Award for Architecture. It was only a question of time before Anna Heringer and Martin Rauch would work together – especially because Anna Heringer was a student of Martin Rauch. “It was him who introduced me to clay as a building material,” she says. Born in the Austrian state of Vorarlberg in 1958, Rauch is artist and architect and also a leading European expert on earth building. Looking for interesting projects, the two earth building specialists came across the competition for the school in Chwiter. “We knew immediately that it was just the thing for us,” Martin Rauch says. “But we soon realized that we needed the support of others.” They found it in two other architects from Vorarlberg, Elmar Nägele, born in 1953, and Ernst Waibel, born in 1955. Elmar Nägele remarks, “It was the first time we worked together as a team. It proved to be a fortunate constellation: our individual skills complemented one another well.” The first stage was an open competition. Out of the 75 entries from all over the world an international jury chose six to go through to the next stage, including that of the Vorarlberg team. Their project was a school constructed mainly of earth and other natural building materials.
Designed by hand
The chosen teams were invited to a hearing in Marrakesh, Heringer, Rauch, Nägele, and Waibel traveled to Morocco together to meet the contracting entity and view the site. “This start to the second stage of the competition was extremely important for us,” Elmar Nägele’s sums up. “So far we have visited Marrakesh four times and spent a lot of time studying the site and developing a sense for the proportions, the local handicrafts, and the cultural identity.” In this process they were supported by Moroccan architect Salima Naji, a condition of the competition being that foreign teams had to work with a local specialist. Salima Naji played an important role as advisor to the team. The project itself was largely designed in Martin Rauch’s studio in Schlins in Austria, using a clay model on a scale of 1:100. “We worked as sculptors as much as anything else,” Ernst Waibel recalls. “The four of us stood around the block of clay, each of us working with both hands. Clay has the advantage that it is very easy to work with, to cut with a knife, and add and remove bits – you can immediately put your ideas into practice: we used our fingers to shape the façade and spoons to cut out windows.” We expanded, rearranged, reduced and reshaped the various elements of the school complex. The group spent a lot of time running up to the gallery of the studio to get a bird’s eye view of the model. “Sometimes we felt that we weren’t getting anywhere at all,” Anna Heringer comments. “And there are also creative disputes, of course: someone would remove something and someone else would put it back – and then the element would disappear again.” Finally, at some point we all felt: That’s it. The model was transferred to the computer; just eight weeks after starting on the second phase of the competition, the plans were sent off.

Ksar and medersa
The jury was extremely impressed with the design and declared it the winner. The architectural idea behind the project is that of a man-made landscape shaped by dynamically intersecting earth walls topped by an undulating silhouette. “Our building should serve those that use it as a good example of sustainable building and engender a certain pride in local traditions,” Anna Heringer remarks, “and in a way that encourages them to apply these traditions in the future.” In addition, the building should also offer the students a safe place to develop their own ideas. Hence, the design is inspired by two Moroccan archetypes: the ksar and the medersa.

Ksar is the term used for a fortified, compact Berber village of individually secured houses packed closely together within a protective wall. The medersa is the traditional Islamic school with its impressive courtyards. The combination of these two institutions lies behind the team’s spectacular complex, which is surrounded by a wall up to eight meters high. The earth for the massive wall came from the excavations. The wall is left in its raw state; the experts in earth building allow for a so-called calculated erosion: when the outer layer of the earth wall gets wet, it swells, which prevents the moisture from penetrating deeper into the dry wall.

School with organic food garden
On entering the complex through the large threshold, visitors find themselves in a beautiful garden full of shady trees. The school facilities are housed in several buildings compactly grouped in the middle of the complex; this area is vaguely reminiscent of the ancient center or medina of old Moroccan cities with its galleries,

“We worked as sculptors as much as anything else.” Ernst Waibel

From left: Martin Rauch, Anna Heringer, Elmar Nägele and Ernst Waibel.

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Global Holcim Awards Finalist Africa Middle East

terraces, and small courtyards. The buildings differ in shape, size, and structure according to function. At the center the auditorium rises above the rest of the complex, surrounded by the compact U-shaped main building with exhibition spaces, classrooms, and offices. Next to this is an industrial hall for the prefabrication of rammed earth elements — because this is the building where the students will make the elements used in constructing the rest of the school, it will be the first part of the complex to be built. Dotted around are shady niches where students can meet. At the rear of the complex is a garden with olive trees and organic beds where vegetables can be grown. The design makes use of local traditions of craftsmanship: locally produced, perforated ceramic tiles will shade the walls. Where necessary, walls will be plastered with tadelakt, a traditional Moroccan lime plaster once used by Berbers to caulk their cisterns. Even though traditional elements play an important role in the design, the school is technologically state of the art. “We do not see any contradiction between tradition and modernity, poetry and function, economics and ecology,” Ernst Waibel says. A 330 m² photovoltaic system planned for the roof of the auditorium will cover all of the school’s electricity needs. The ventilation system is a refined combination of old and new technologies: the air supplied by a wind catcher in the entrance courtyard is preconditioned in ground heat exchangers in the foundations and distributed through the precast hollow, core earth elements. Rainwater collected on all roof areas and in courtyards also helps to cool the air. Despite the blazing sun of Marrakesh, there will be no need for additional cooling. Calculations show that on only 25 days will inside temperatures exceed 26 degrees, but never going higher than 29 degrees. Because the earth walls retain a lot of heat, it will seldom be necessary to heat the buildings in winter.

Center for earth building

The fact that the competition was won by a foreign team with an earth building project is an interesting indicator of the development of building in Morocco. At one time the North African country was home to earth building of the finest quality. However, the great tradition of earth building has been in gradual decline for the past century. There are many reasons why builders gave and give precedence to concrete and brick. The expansion of the railways made it easier to transport alternative building materials. Social aspects also played a role: people like new things, and earth was soon disqualified as a building material for those who could not afford anything else. And where it was still used it was looked upon as a temporary measure; hence, little trouble was taken with it. “Earth building ceased to develop,” Martin Rauch comments. Quite the opposite: traditional skills were gradually forgotten. The expert is convinced that “of 2000 architects in Morocco perhaps three know how to work with earth.” Hence, in Martin Rauch’s opinion, the fact that several projects involving earth buildings won prizes in the most recent Holcim Awards competition sends an important signal. “It confirms the growing appreciation of building with earth.” The team hopes that its project will demonstrate that the use of earth is not imical to modern processes. According to Anna Heringer, “Earth is an appropriate material for contemporary building. We hope that a modern architectural language will motivate people to practice sustainability — by making intelligent use of natural building materials, combined with modern technologies and passive design mechanisms.”

“You can recycle earth a thousand times and it is still good earth.” Martin Rauch
A construction material with some striking advantages

With the ability to equalize temperatures and retain heat, earth as building material can quickly absorb moisture from the air and release it back again; in the process it creates a well-balanced ambient climate with an ideal humidity of 50 percent. Earth buildings cost little in upkeep as it is easy to touch up joins and cracks. The material has striking advantages in respect of sustainability: earth is eroded stone and, hence, available at just about every building site, which massively reduces transport costs. “Moreover, you can recycle earth a thousand times and it is still good earth,” Martin Rauch adds. “If you want to demolish a wall, you can simply knock it over and leave it to nature — or use the earth to build something new.” Furthermore, Rauch thinks it an advantage that earth is identified with place: “When you see an earth building you inevitably feel that it has been there a long time. It automatically looks like part of the environment, because it is built with local material. For this reason our school will also have a tremendous impact among the new buildings in Chwiter.”

Anna Heringer adds: “It is true that building with earth is labor-intensive, but that is not an argument against it. There are now seven billion people on the planet. They need not only good housing, they also need work.” As an architect she always has to ask herself: How can I build to ensure that human resources are used as sensibly as possible?

Same building, new purpose

It is some time since the team built a clay model of the school in Martin Rauch’s studio. In the meantime, the Fondation Alliances has decided that the building should serve another purpose: instead of a school, it should be a center for sustainable construction. “It will be open to a wider group of interested people,” Elmar Nägele says. It will include, among other things, an exhibition on the sustainability of materials, sales rooms, studios for children, small laboratories, and an auditorium. Anna Hering is aware that “there is a pretty vibrant alternative scene in the area, but people have hardly any possibility to obtain information or exchange views with one another. This building offers a meeting place for the many small, isolated initiatives.” The intention is for the Fondation Alliances to operate and finance the platform. The space allocation plan is unchanged, but the exhibition rooms are bigger. And the building’s potentially greatest long-term impact is also unchanged: the ability for people to experience sustainability with all their senses.

“In the regional phase of the 3rd Holcim Awards competitions, this project was awarded Bronze in Africa Middle East. See page 174.”

“Building to ensure that human resources are used as sensibly as possible.” Anna Heringer
Modernizing tradition

A project in a rural area near Lahore is changing a village community — through a school, courses for women, and exemplary organic farming. A new school building proves to the local inhabitants that even today their established building traditions provide suitable solutions to climatic challenges.
Like millions of people in the world, Asaf Jah has two homelands: his country of origin and his country of choice. His roots are in Pakistan, but he lives in Germany, where he and his German wife raised their children. After retiring, Asaf Jah decided to put his energy into a development project in the country of his birth. He bought a piece of land near the village of Jar Maulwi – very close to the house in which his grandfather lived more than 50 years ago – and initiated the Tipu Sultan Merkez (TSM) project. Jar Maulwi is located approximately 70 kilometers from Lahore, in an extremely poor rural region. Here, among the rice and wheat fields, much is lacking. Above all schooling: education in Pakistan is in a dire state; in government schools classes are regularly canceled and the quality of instruction is very poor. And because it is often just too far to walk, many children do not go to school at all.

Educating girls and women
At the heart of the TSM project are a school and kindergarten. The school opened in 2001. It is politically and ideologically independent; children are admitted regardless of religion and caste. The TSM project now includes a kindergarten, a pre-school, a primary school (grades 1 through 5) for girls and boys, and a secondary school (grades 6 through 10) for girls only. Schooling is free, both because of the precarious financial situation of most families and because most families, if forced to pay, would choose not send their daughters to school. The project focuses in particular on girls and women, as they suffer most from the poor economic conditions and social realities in the village. Today some 260 children and adolescents attend school at TSM. The main subjects are Urdu, the national language of Pakistan, English and mathematics. Almost all women teachers are locals.

Rapid acceptance – huge demand
TSM is far more than “just” a school: The center also trains women teachers and instructors, provides further education programs for women – for instance, an 18-month course in sewing –, and offers farmers from the surrounding areas help for self-help. At TSM they can borrow a tractor and trailer or a plow free of charge. The project also has a school garden in which fruit, vegetables, rice, and wheat are cultivated organically. All of these activities are financed by donations from Germany and Pakistan. The sponsor of TSM is the non-profit organization Verein für Entwicklung, Bildung und Selbsthilfe (VEBS; Association for Development, Education and Self-Help), founded in Germany in 2007. Most of the active members of the association are members of the Jah family. It is largely due to their family connections in Pakistan that TSM gained acceptance so quickly among the local population. In the meantime, the school is bursting at the seams; a new class.

“We are not here as Western do-gooders or know-alls, but as friends with some know-how.” Eike Roswag
is added each year, and the eight rooms in the building erected in 2001 have long been unable to meet the school’s needs.

Cooperation with experts
To address this situation, a few years ago the initiators of the TSM project began to think about a new school building. Whereas when the school was founded the overriding concern was simply a building in which to teach children, now the initiators emphasized the relevance of sustainability: their vision was one of a school building that would provide an example of ecological and efficient construction for the surrounding areas. “And this is where we come into the project,” says architect Eike Roswag, born in Berlin in 1969. “One day Akim und Karim Jah, two of Asaf Jah’s sons, came into the office and wanted to talk to us about an extension to the school.” Of course, it was no coincidence that the TSM initiators approached Ziegert | Roswag | Seiler Architekten Ingenieure (ZRS) with their request: the Berlin architectural and engineering office has a global reputation for sustainable earthen buildings. Eike Roswag is an expert in intercultural projects. The architect grew up as one of eight children in a farming family. “My family is part of my roots,” he says. “Farmers like to build and they have a practical approach to building.” Laughing, he adds: “Of course, they always know better!” He first trained as a joiner and cabinetmaker, and this continues to influence his work as an architect. “My interest in architecture did not come via the arts, but via craftsmanship and construction.”

Architecture as genuine development aid
In time Eike Roswag found cabinetmaking “almost too refined,” and so he began to work as a carpenter. On the building site he saw what an interesting role the architect had and decided this was his career. Roswag came to Berlin and has been here ever since. At the Technische Universität Berlin (TU Berlin) he studied building construction and design. An important influence in his professional development was Professor Ingrid Goetz. In 1998 she introduced a “practical seminar on Mexico.” The interdisciplinary course on theory and practice combined learning with social involvement and gave participants the opportunity to implement ideas on how to benefit others. In the seminar the future professionals learned their discipline as real, creative work that can change people’s everyday lives. Eike Roswag became a student assistant in this project, and there met Christof Ziegert, research assistant in design and structure. In 2003 the two joined up with engineer Uwe Seiler to found the architectural and engineering office ZRS.

“My heart beat faster”
On the Mexico project Eike Roswag also met Anna Heringer, the German specialist in earth construction who won the Holcim Awards Bronze 2011 Africa Middle East. She and Roswag designed a new school built of mud and bamboo in Bangladesh. In 2007 the project won the prestigious Aga Khan Award for Architecture. “This prize has opened up so many doors for us in the Islamic world,” Roswag remarks. Since then, for example, ZRS has worked in Abu Dhabi, Jordan, and Morocco. He feels that “Today we have the confidence to go just about anywhere in the world and build a school with the locals.” So when the two sons of Asaf Jah explained their plans to him in Berlin, he was
immediately fired up. "My heart literally beat faster. The family is incredibly friendly and motivated."

Earth is good, but not popular
It was clear from the start that natural building materials would be used for the new school building. Earth is a common building material in Pakistan; it is free, so to speak, and possesses many outstanding qualities. Earth absorbs harmful substances, is antibacterial, and endlessly recyclable. Because it stores both moisture and warmth, it ensures a balanced indoor climate. An earthen building needs little or no artificial cooling and heating, which is an enormous advantage in a village like Jar Maulwi, which is located in a warm, semi-arid zone. The average January temperature is a cool 12 degrees, in June a hot 34. Yet, despite its many advantages, earth is not a popular building material among the locals. In a survey that members of the architectural office conducted in Jar Maulwi and surroundings people complained about the time and effort involved in the maintenance and repair of earthen structures. "But that has less to do with earth as a building material as such," comments Eike Roswag, "and more with the way people build in the region."

Most buildings lack a so-called horizontal barrier to prevent moisture in the ground from rising in the wall, and floors are not sealed. In summer many people use the roof of their one-storey houses as a living area and to sleep. As the construction is not designed for this, cracks develop in the roofs, which leak and have to be repaired. Those who can afford it prefer to use bricks and concrete for their house.

Leading by example
"Our school is intended to show that a well-planned, modern earthen structure is not only a low-cost, low-energy alternative to brick structures, but also more sustainable than less well-built earthen constructions," Eike Roswag explains. The new school structure must draw on local traditions and at the same time update existing methods. Is it not presumptuous of Germans to show people in Pakistan how to improve their traditions? Eike Roswag waves dismissively. "We are not here as Western do-gooders or know-alls, but as friends with some know-how." He continues that the important point is to highlight examples in the local culture. "In some rural areas the Western, urban way of life is still seen as a model," Eike Roswag remarks. "In such cases it is ideal when we can show that we, too, have used earthen structures for many centuries and that they are highly valued. Leipzig has the most cob buildings in Europe. When you tell people that, their attitudes can suddenly change."

Ceiling prototype in Berlin
The design of the new school building is the result of many discussions and much research. Eike Roswag: "Akim Jah explained the requirements and told us how the children learn. Important features of TSM include the garden and veranda, the children often have classes on the veranda because it gets too hot in the classroom under the tile roof of the existing school. The new school structure must also include covered, cool, well-aired outside spaces." The new building consists of two separate earthen structures, in compliance with earthquake safety requirements, an important factor in this region. The school structure is built on a brick foundation. This foundation helps to protect the earthen walls against splashing water and flooding. A horizontal barrier of bitumen prevents water rising into the 60 cm-thick cob walls of the ground floor. The upper-floor walls consist of a bamboo frame construction in-filled with straw and other natural building materials. The ceiling is also made of bamboo. The ingenious three-layer construction was developed by ZRS. The 1:1 model in the Berlin office immediately catches the visitor’s attention, and the demonstration of its load-carrying capacity is one of the highlights of every visit. The staff all climb on to the ceiling construction and jump up and down – to prove that the load-carrying capacity is more than adequate for normal school use.

Natural air conditioning
The outer walls of the school structure must be protected against weathering, rain, and strong wind. The solutions in the ZRS design are pragmatic – the big, covered veranda runs along the north side, the principal weather side, and the walls are set far back. A bamboo screen surrounds the entire upper storey and also provides shade. The new school structure contains eight classrooms, four on the ground floor and four on the upper level. The windows are designed to allow sufficient light into the classrooms, without letting in so much sun that it heats the rooms excessively. In winter passive solar heating will ensure that the classrooms are reasonably comfortable; the children are on school break in the coldest months of the year. "Anyway, cold is not the problem," Eike Roswag elucidates, "the challenge is the heat. And for heat, earth is the ideal solution. The moisture absorbed in the night is released into the air during the day, creating a powerful cooling effect."

"Chance that people follow suit!"
The double-story building is a sensation in the region. "They don’t have that here," Eike Roswag explains, "people sleep on the roof, but virtually nobody has two covered storeys.

In his opinion it is important that people in Pakistan also start to think about building upward, as even this huge country suffers from sprawl. But it is not only the two levels that people in the surrounding areas like about the building, the school has fundamentally energized the village community. Construction, which will be completed in mid-2012, also serves as a form of vocational training program. "We are training craftsmen, so that later they can use and develop these building methods themselves," Arne Tönissen, who directs on-site construction, says. "We are going to offer two courses a year. Who knows: perhaps people will then start coming from the city to TSM to learn how to build earthen structures." At any rate, Eike Roswag is convinced. "The people we are building the school with will soon build earthen houses for themselves. By restricting the building materials used in this structure to the minimum necessary, there is a chance that the locals will follow suit. Working on such a project makes a powerful impact. Using materials that the people themselves have automatically builds a bridge." And Eike Roswag attatches a lot of importance to building bridges. ZRS has assumed all the costs for planning and materials testing for the school extension.

In the regional phase of the 3rd Holcim Awards competitions, this project was awarded Gold in Asia Pacific. See page 190.

“We are training craftsmen, so that later they can use and develop these building methods themselves.” Arne Tönissen
“My interest in architecture did not come via the arts, but via craftsmanship and construction.” Eike Roswag
Alternative urban growth

The disastrous flooding in Bangkok 2011 demonstrated the vulnerability of megacities – and their dependence on their hinterland. A project near the city center could serve as a model for greater food security. The courageous initiators take the view that cities need not only high-rises, but also farms.
Isavaret Tamonut is faced with a common dilemma of builders: he is convinced about the importance of a project, but he lacks the means to realize it. However, Isavaret Tamonut is an exceptionally resourceful young businessman when it comes to raising funds. “When I heard about the Holcim Awards competition I said to myself: ‘That is just the thing for our project!’,” he recounts. “I said to my partners: ‘We are going to submit our idea, hope that we win a prize, and then use the money for the project.’”

Given the quantity of top-class entries in the competition, the plan sounds a little far-fetched. Yet it worked: Urban Farm Urban Barn won the Holcim Awards Silver 2011 for the Asia Pacific region. “This prize makes it possible to go ahead with our project,” Isavaret Tamonut comments.

Wonderful farmland abandoned
In conversation with Isavaret Tamonut it is soon apparent that he is willing to try unexplored paths. Born in 1979, the native Thai studied economics in Bangkok and Japan and worked for various banks, before founding his own publishing house “Freemind Publishing” a few years ago. Since then he has published books on health, philosophy and meditation, topics that have long interested the economist.

Isavaret Tamonut grew up in his parents’ textile factory in Bangkok. The family-owned company produces fabrics and employs about 30 people. “The business is doing well,” he tells us, “but in reality the factory has always been too big.” The factory building has three storeys; the family lives on the top floor, on the lower ones there is far more space than needed for the fabric production. The property on which the factory stands is also huge: more than one and a half hectares. The land used to be farmed, mainly coconuts, bananas and vegetables. The entire plot is crisscrossed by a network of irrigation canals. The presence of fireflies is an indicator that the soil is not contaminated and thus still suitable for agriculture.

Pioneer in sustainability
“It is clear that we had to find a use for this valuable piece of land,” Isavaret Tamonut says. In recent years the property value has risen enormously. Although the factory stands about ten kilometers from the center of Bangkok, the city is expanding all the time and what was once on the edge of town is now a near central location. Offices and condominiums have shot
up around the Tamonut’s property, the immediate vicinity is a sought-after address for major company headquarters. As a result the family began to think about how they could put the wasteland to better use. Isavaret Tamonut conferred with Singh Intrachooto and his associates at Architect Kidd. Born in 1967, Singh Intrachooto is regarded in Thailand as a pioneer of sustainability. He studied in Seattle and at the Massachusetts Institute of Technology (MIT) and today heads the Building Innovation and Technology programs in the Faculty of Architecture at Kasetsart University. However, Singh Intrachooto is known above all for his Osisu label. He recounts: “Despite specializing in sustainable construction I noticed that when my architectural projects were completed an enormous amount of debris was always left lying about. As more than 30 percent of urban landfill content in Thailand is building waste, I began to think about what I could do with it.” The result of his deliberations was the decision to design and manufacture attractive furniture using recycled materials. Singh Intrachooto’s creations, marketed under the Osisu label, not only meet the highest aesthetics standards, but are also as environmentally compatible as possible. In the meantime, the furniture made of fiber board, wood splinters, tree roots, laminate or cardboard is sold all over the world, and Singh Intrachooto and Osisu are the subjects of countless articles. Today the architect is one of Thailand’s leading ambassadors for sustainable thinking.

What does the city really need?
The designer recalls: “Isavaret approached me a few years earlier when he was compiling a book on global warming for his publishing company. This time he asked me to visit him and take a look at the property.” Singh Intrachooto was happy to accept the invitation. As he recalls, “I didn’t have any expectations. I had never been there, had no idea what Isavaret wanted – but I did know that we had a lot of interests in common and that something interesting could come of it.” Singh Intrachooto was immediately taken with what he saw: the property was a haven for local fauna and offered enormous potential for a sustainable project in a city in which development was anything but sustainable. “In the following weeks and months Isavaret and I as well as Architect Kidd talked a lot about Bangkok, pored over data, and tried to work out what we could do for the city that would be of lasting value,” he recalls. One thing was already clear: another multi-storey block of condominiums would not be a sustainable contribution to urban development.

Getting farmers to farm
The team developed what is in essence a four-part project. A 4000 square meter urban farm for the cultivation of vegetables and mushrooms is planned at the rear of the site. The initiators have consulted in depth with horticulturalists at Kasetsart University to determine which plants are particularly suitable for cultivation on this site. Isavaret Tamonut would also like to get the input of potential customers about the kinds of vegetables they would like buy. “There is a bank headquarters nearby with about 4000 employees,” he tells us. “We hope that many of them will stop at the farm and shop for vegetables on their way home.” The idea is to grow those vegetables, mushrooms and fruit that the people in the neighborhood like to eat. “Bangkok is a magnet for people from provinces all over the country, including many farmers,” Singh Intrachooto points out. “By contributing their expertise they can create another source of income for themselves: they would grow organic crops on...”
part of the urban farm and sell us their crops.” This could provide work for between ten and 20 people.

**Flowers as billboard**
Adjoining the farm there would be an urban market. Farmers from the surrounding areas could rent market stalls here to sell their produce. “We are bringing agriculture back into the city,” Singh Intrachooto explains enthusiastically. “Farmers and city dwellers would interact directly – which would recreate a balance between the natural environment and the built environment.” The third component in the project is the urban barn, a modern covered structure facing the six-lane street that runs along the property. This is designated primarily for growing flowers. “Thais love flowers and people photograph everything that they find beautiful,” Singh Intrachooto remarks. “For that reason we have placed the nurseries at the front of the property, where people can see them. The nurseries are, as it were, a natural billboard for our project.” The final element of the project is the existing factory building: One section of it will be converted into an eco-shopping mall containing 25 to 30 shops of companies with socially and environmentally responsible manufacturing operations. “Before we can begin work on the project we need to have tenants for more than two thirds of these shops,” Isavaret Tamonut states. Further buildings and facilities will be dotted around the property, including a restaurant and a coffee shop. The estimated cost of the project is USD 1.5 million.

**Sceptical property owner**
Isavaret Tamonut Urban Barn is sustainable through and through. For example, the project uses of recycled steel, recycled coffee ground, reclaimed glass panels, fiberboards in construction and incorporates advanced waste management, LED lighting, and solar energy. To irrigate the plants it is foreseen to use rain water on the one hand and water from the nearby Great Chao Praya River on the other. The water is stored in large reservoirs and distributed via a sophisticated system of nozzles and hoses. The project has transfixed Singh Intrachooto, and the architecture team is putting all the knowledge and experience acquired in the years of work on sustainability into it. “I probably spend more time on it than on a 500-million dollar project I’m supervising at the same time,” he says laughing. “Because I see that here I can create something really sustainable. With major projects I also fight all the time for sustainability, but in such cases I often have to accept compromises.” The architect’s enthusiasm is infectious and long ago worked its magic on Isavaret Tamonut: the young entrepreneur wholeheartedly supports the concept. But he also sees the difficulties involved in the project. One of them is his father’s skepticism. “He would prefer a project that provides a safe return – for instance a large block of condominiums,” says Isavaret Tamonut.

**Dramatic lack of green space**
The two initiators of the project regularly discuss matters with the family, whose objections cannot simply be swept under the carpet. “Isavaret also repeatedly questions whether the project really is the best solution for everybody,” Singh Intrachooto says and laughs. Isavaret Tamonut adds: “At present we have so much space and privacy on our property; Urban Farm Urban Barn will mean a huge"The project has to be commercially viable.”

Isavaret Tamonut

“We want to show by example that land in Bangkok is not there only to be built on.”

Singh Intrachooto
change in my family’s way of life. Something like this has to be well thought through.” But even though he questions his own ideas, in the end he always comes to the conclusion that he is on the right path.

“We want to show by example that land in Bangkok is not there only to be built on. With each passing year Bangkok grows warmer, and one reason is the lack of green developments and recreational areas. Everything that we consume in the city has to be brought in from outside. That is not sustainable.” The disastrous flood that inundated Bangkok in late 2011 shows how vulnerable this society is – and how dependent on the outside world. Hence Singh Intrachooto’s demand: “We need to produce food in each district so that we can provide better food security – and a greener urban environment.”

“It must pay its way”
Isavaret Tamonut, the economic expert, adds: “The project has to be commercially viable.” To make sure that he understood the financial implications of the project, he took a three-month course in real estate management. “It is not enough to have a piece of land and build something on it; for a building project to be successful you have to think in several dimensions. And I had only a banking background.” Are there really enough people in Bangkok who are interested in organically grown vegetables – and are they also prepared to pay a little more to buy sustainably produced food? Isavaret Tamonut is convinced that “there are lots of people among us who want to live sustainably. The big question, however, is the size of this group. My father, for one, doubts that it is large enough for our project to thrive.” Singh Intrachooto and his Architect Kidd associates are much more optimistic. “We believe that people are ready for our project! Investigations we have done on this question show that 90 percent of the inhabitants of Bangkok are interested in the ecological situation of our city. But this does not answer the question of whether they are also prepared to pay a premium for organic produce.” Ultimately, that will be known only when the products are available. “Winning the Holcim Awards Silver, however, has brought us a substantial step closer to realizing our dream,” Isavaret Tamonut assures.

In the regional phase of the 3rd Holcim Awards competitions, this project was awarded Silver in Asia Pacific. See page 192.
Finally Kenneth Yeang has the opportunity to erect a large building in the new administrative center of his homeland. The Malaysian architect’s ecologically designed retail and commercial building demonstrates the feasibility of green architecture even within a tight corset of regulations.
Kenneth Yeang.

The traditional songket pattern on the glass façade is a reference to Malaysian culture.
“If we want to make sustainable architecture popular, we have to make it look good.” Kenneth Yeang
Creating cities out of thin air – something found only in computer games one might think. However, for the past two decades the government of Malaysia has been realizing a massive urban development project. In the 1980s the government came up with the plan to move the country’s administration from Kuala Lumpur, the hopelessly overcrowded capital, to the new city of Putrajaya that would be built from the ground up about 25 kilometers away from the capital. Architect Kenneth Yeang, whose works include the Solaris building in Singapore and the Elephant & Castle Eco Towers in London, recalls: “This area used to be covered by extensive palm oil plantations.” The Malaysian government bought about 46 km² of land and building began in 1995. The new city was named after Malaysia’s first prime minister, Tunku Abdul Rahman Putra. The suffix jaya means success, victory, or perfection.

A building at last
All building activities in Putrajaya have to be approved by Putrajaya Holdings. There are no exceptions, also not for luminaries like Kenneth Yeang and his renowned architectural office T.R. Hamzah & Yeang International. “We have taken part in various competitions,” the 63-year-old recounts. “But up to now the only time we won was for the Millennium Monument.”

Aside from the 68 m high obelisk, the project Plot 2C5, which won the Holcim Awards Bronze 2011 Asia Pacific, is the second construction project in Putrajaya awarded to Kenneth Yeang. “The people responsible for the decision pulled my leg, saying: ‘Now you’ve got a building too at last.’” Everybody is aware of the enormous prestige attached to the building, as it stands on the main boulevard directly opposite the Ministry of Finance.

Rules, rules, rules
Kenneth Yeang and his team have experienced for themselves just how difficult it is for architects to navigate in such an environment. “For example, there were restrictions on the height of the building,” the architect recalls. A skyscraper was out of the question, although T.R. Hamzah & Yeang International are specialists in skyscraper construction. “What is more, the side of the building facing the street has to accommodate heavy pedestrian traffic and intensive use of the ground floor. And because Putrajaya also has a representative function, the building has to reflect Malaysian culture in some form.” Naturally the project had to comply with the city’s strict ecological guidelines: Putrajaya, after all, is not to become just another urban monstrosity. “In the end we had to revise the winning design twice before everything was as it had to be,” the architect recalls.

Double skin façade insulates
Finally, the architect had approval for a design for a retail and commercial complex which not only meets the authorities’ building and aesthetic requirements but also upholds the tradition of green architecture, with which Kenneth Yeang has made a name for himself. Two identical towers 14 storeys high flank a central atrium. The two buildings are linked together by a pedestrian bridge, which serves to tie the project together. However, each of the buildings has its own autonomous set of technical systems. The façades of the buildings consist of two layers of glass separated by “an air cavity with an insulating function,” Yeang explains. “At the same time the outer green glass façade provides protection against sunlight.” A feature of the façade is the traditional Malay songket pattern, which fulfills the cultural reference requirement. The inner double-glazed façade reduces the building’s energy consumption as well as noise.

A living building
The showpiece of the project design is the integrated indigenous vegetation. “The building is alive,” says Kenneth Yeang, even as he admits that more could have been done in this respect. “Nonetheless, we have green roofs, green lobbies, and a plantscaped façade.” The choice of plants has yet to be finalized. What can be said, though, is that they will be indigenous species that do not need too much water. Here, too, sustainability considerations play a fundamental role. “We want to save water!” Harvested storm water is collected in a transfer tank, filtered, and then pumped to where it is needed to irrigate the plantscapes. The architect is adamant that the energy usage for this will be as low as the time spent taking care of the plants. “Four, at most five gardeners can maintain all the green areas of the two towers without a problem. Which is why we also call it the Four Gardeners Building.”

Thinking in habitats
It is obvious that the vegetation is intended to enhance the feelings of people in and around the building. But there is far more to the plants than meets the eye. “Our current approach is to try to think in habitats,” Kenneth Yeang explains. “By doing so we increase a location’s biodiversity.” Successful implementation of this method requires a lot of research, because the architects also want to integrate fauna into their designs. “We consider which animal species – mammals, birds, insects – we want to promote and then choose the appropriate flora.” These theoretical considerations are entered in tables, which makes the work easier. However, as the architect admits, there is always an element of uncertainty. “After all, we are dealing with nature – and nature can never be programmed to the last detail.” In a project in Scandinavia the plants chosen for the west side of the building simply refused to grow. “We never discovered the reasons for this. The same species were integrated into all sides, yet in the west it just didn’t function.” In such cases all you can do is substitute another species for the recalcitrant plants. “That is not a problem as we work with planters that are easy to replace.” When everything goes as intended, the plantscapes can also make a contribution to thermal management by significantly reducing the costs of heating and cooling.

Caution, glass!
The project will take about three years to complete. Local companies will carry out the lion’s share of the work. In Kenneth Yeang’s opinion, “We have green roofs, green lobbies, and a plantscaped façade.” Kenneth Yeang
it is a very easy structure to build, even if there are some tricky elements. “Our main concern is the façade, as it is naturally the part of the building that is always on view. The pedestrian bridge between the two towers will also be a challenge.” He continues that the glass façade is the element that will require the most attentive maintenance over the years. Although the glass is very stable, he says, care will have to be taken that the edges remain intact. “This is why we are strengthening the edges by placing a metal spacer around them. Nonetheless, the cleaning personnel will have to be careful with their equipment.”

Creating a sustainable city
His aim to create as many green buildings as possible makes Kenneth Yeang extremely reluctant to lower his standards. He is not easily satisfied and thus remarks about Plot 2C5: “It is not the greenest building I have ever designed.” For example, during the revision phase the proposed rooftop photovoltaic arrays were eliminated. Nevertheless, the architect is pleased with the recognition accorded his work by the Holcim Awards Bronze 2011 Asia Pacific. And he suspects that this prize will encourage the client to view the project in a more favorable light: “I hope that the award will encourage the city planners to place even more emphasis on sustainable construction.”

As it is, the authorities already attach great significance to prudent and sustainable design for Putrajaya. For example, under the guidelines of the Detailed Urban Design 38 percent of the urban area much be planted with vegetation or left in its natural state. The green space includes extensive wetlands that provide a biotope for countless animal and plant species. On Core Island, which lies in an artificial lake covering 400 hectares, there are very strict guidelines governing mobility: public transport must account for 70 percent of total traffic. It is hoped that this will keep both exhaust emissions and traffic as low as possible. Finally, in 2009 a recycling project was launched that is intended to reduce the waste going to disposal sites by 40 percent.

Between business and conviction
Kenneth Yeang is happy about the ongoing progress toward sustainability – especially because he has also experienced times in which eco-architects were belittled or even derided. “In 1985 I designed the house in which I still live today,” recalls the architect, reflecting on changes to professional architecture. “It was an experimental design that many of my friends and customers ridiculed. That house significantly hurt my business back then.” Indeed, business is often the greatest enemy of green architecture. He himself has designed some buildings that he is not proud of, confesses the architect, who since the early 1970s has made the development of sustainable construction his aim in life. “I have probably

Rainwater is collected from the roof gardens, filtered and stored in collection tanks, and then used to irrigate the plants.
“After all, I’m just an architect, serving my clients.” Kenneth Yeang

It’s about more than just building

In the years and decades during which Kenneth Yeang became a pioneer of green architecture he developed a sustainability concept that encompasses far more than the design and construction of buildings. To explain his principles he must almost begin philosophizing: “The essence of all sustainability is to live in harmony with nature. And that is easier said than done because we tend to forget that everything we do has an influence on nature. It involves not only the buildings we construct, but our whole way of life.” Equally difficult – but just as important to achieving sustainability – is to repair mistakes that have already been committed. Considering these precepts, it is natural for him as an architect to build as green as possible. “But there’s much more to it. As an architect, it’s also my job to convince my clients that the task of sustainability is not achieved with the construction of a single building. It’s ultimately about inspiring people who have the power to fundamentally change things.” As an architect with an environmental agenda, he has never expected to be welcomed with open arms. “After all, I’m just an architect, serving my clients.”

It must be beautiful

Nevertheless, Kenneth Yeang is far from wandering from his path – “although architects of sustainable projects must invest two to three times more work in projects than traditional architecture requires.” One cannot simply sit down and draw a building; one must first consider the issues of climate, vegetation, building materials, energy, water, ideal form, proportions, and much more. Still, Yeang is firmly convinced that sustainable construction will prevail – at least the developments over the past ten years would indicate that. “My generation of architects did not grow up with concerns about sustainability. Future generations of architects will of course create green architecture – their training will see to that.”

But Kenneth Yeang denies that sustainable architecture is automatically good architecture: “There are countless bad examples of sustainable architecture, simply because the buildings are ugly – and that contradicts our mission.” The emotional reaction of people to something new is decisive when it comes to whether that thing will be accepted or not. “A good example is the iPod. We now know that it is so successful for three reasons: first, it looks good; second, it works reliably; and third, it is fun to use. The first reason is the most important. I see that again and again myself when I show clients a new design.

They are primarily interested in what the building looks like, and not whether it is sustainable. Only when the initial emotional response is positive are the clients ready to rationally consider further aspects.” In other words, if we want to make sustainable architecture popular, we have to make it look good. “Because that’s just the way people are,” says Kenneth Yeang. And what happens when sustainable architecture becomes mainstream? “Then architects can concentrate once again on what our profession is really about: making buildings that are a pleasure to use.”

In the regional phase of the 3rd Holcim Awards competitions, this project was awarded Bronze in Asia Pacific. See page 194.
## Regional Holcim Awards competitions 2011

**Winners by region**

**North America**
- Canada, Iqaluit, Nunavut
  Holcim Awards Gold
  Pages 44 and 128
- USA, Los Angeles, California
  Holcim Awards Silver
  Pages 50 and 130
- USA, Van Buren, Maine
  Holcim Awards Bronze
  Pages 56 and 132
- USA, Lawrence, Kansas
  Holcim Awards Acknowledgement prize
  Page 134
- USA, Honolulu, Hawaii
  Holcim Awards Acknowledgement prize
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- USA, Fort Leonard Wood, Missouri
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  Holcim Awards Acknowledgement prize
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- USA, Miami, Florida
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  Page 142
- USA, Providence, Rhode Island
  Holcim Awards “Next Generation” 2nd prize
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- Canada, Toronto, Ontario
  Holcim Awards “Next Generation” 3rd prize
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**Latin America**
- Brazil, São Paulo
  Holcim Awards Gold
  Pages 16 and 148
- Chile, Constitución
  Holcim Awards Silver
  Pages 62 and 150
- Mexico, Ciudad Juárez
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  Holcim Awards Acknowledgement prize
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- Mexico, Mexico City
  Holcim Awards Acknowledgement prize
  Page 162
- Argentina, Córdoba
  Holcim Awards “Next Generation” 1st prize
  Page 164
- Bolivia, Puerto Suárez
  Holcim Awards “Next Generation” 2nd prize
  Page 166
- Brazil, Rio de Janeiro
  Holcim Awards “Next Generation” 3rd prize
  Page 168

**Europe**
- Germany, Berlin
  Holcim Awards Gold
  Pages 24 and 108
- Belgium, Oostkamp
  Holcim Awards Silver
  Pages 32 and 110
- Italy, near Scilla
  Holcim Awards Bronze
  Pages 38 and 112
- Netherlands, Appeltern
  Holcim Awards Acknowledgement prize
  Page 114
- Switzerland, Zurich
  Holcim Awards Acknowledgement prize
  Pages 116 and 216
- Germany, Hamburg
  Holcim Awards Acknowledgement prize
  Pages 118 and 218
- Finland, Helsinki
  Holcim Awards Acknowledgement prize
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- United Kingdom, London
  Holcim Awards “Next Generation” 1st prize
  Pages 122 and 220
- Spain, Gijón/Xixón
  Holcim Awards “Next Generation” 2nd prize
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- Spain, Seville
  Holcim Awards “Next Generation” 3rd prize
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Holcim Awards Silver
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Malaysia, Putrajaya
Holcim Awards Bronze
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Indonesia, Cepogo, Ngargorejo and Bongkok
Holcim Awards Acknowledgement prize
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Japan, Kobe
Holcim Awards Acknowledgement prize
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India, near Dharmapuri
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Indonesia, Sukoharjo
Holcim Awards Acknowledgement prize
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India, New Delhi
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Indonesia, Jakarta
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China, Beijing
Holcim Awards “Next Generation” 1st prize
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India, Navi Mumbai
Holcim Awards “Next Generation” 2nd prize
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India, near New Delhi
Holcim Awards “Next Generation” 3rd prize
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Burkina Faso, Gando
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Palestine, near Al Azarije
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Nigeria, Zaria
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United Arab Emirates, Masdar City
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South Africa, Cape Town
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Morocco, Fez
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South Africa, Pretoria
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Ethiopia, Gohatsion
Holcim Awards “Next Generation” 2nd prize
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Morocco, Agadir
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Jury meetings and ceremonies 2011

Europe

**Jury meeting**
Zurich, Switzerland: June 23-24
at Swiss Federal Institute of Technology (ETH Zurich)

**Awards ceremony**
Milan, Italy: September 15-16
at Palazzo del Ghiaccio

North America

**Jury meeting**
Cambridge, USA: July 15-16
at Massachusetts Institute of Technology (MIT)

**Awards ceremony**
Washington DC, USA: October 20-21
at National Building Museum

Latin America

**Jury meeting**
Mexico City, Mexico: July 7-9
at Universidad Iberoamericana (UIA)
Supported by: Universidade de São Paulo (USP), Brazil

**Awards ceremony**
Buenos Aires, Argentina: October 6-7
at El Zanjón

Africa Middle East

**Jury meeting**
Casablanca, Morocco: June 16-17
at Ecole Supérieure d'Architecture de Casablanca (EAC)
Supported by: University of the Witwatersrand (Wits), South Africa

**Awards ceremony**
Casablanca, Morocco: September 8-9
at Hyatt Regency and Palais El Mechouar

Asia Pacific

**Jury meeting**
Mumbai, India: July 28-30
at Indian Institute of Technology (IIT Bombay)
Supported by: Tongji University (TJU), China

**Awards ceremony**
Singapore: November 24-25
at Hotel Ritz Carlton
1 Jean-Philippe Vassal, France
2 Leo Mittelholzer, Germany
3 Marta Maíl-Alemany, Spain
4 Jürgen Mayer H., Germany, Head of jury
5 Kai-Uwe Bergmann, Denmark
6 Winy Maas, The Netherlands
7 Lucy Musgrave, UK
8 Hans-Rudolf Schalcher, Switzerland
9 Hansjürg Leibundgut, Switzerland

1 Sheila Kennedy, USA
2 Nader Tehrani, USA
3 Harry Gugger, Switzerland
4 Mohsen Mostafavi, USA, Head of jury
5 Hans-Rudolf Schalcher, Switzerland
6 Bernard Terver, USA
7 Mark West, Canada
8 Ray Cole, Canada
9 Keller Easterling, USA

1 Bruno Stagno, Costa Rica
2 Marc M Angélil, Switzerland
3 Vanderley M John, Brazil
4 Daniel Bermúdez Samper, Colombia
5 Michel Rojkind, Mexico
6 Carolyn Aguilar-Dubose, Mexico, Head of jury
7 Hans-Rudolf Schalcher, Switzerland
8 Angelo Bucci, Brazil
9 Andreas Leu, Switzerland

1 Javier de Benito, Switzerland
2 Hashim Sarkis, Lebanon; Head of jury
3 Joe Osae-Addo, Ghana
4 Abderrahman Lahbabi, Morocco
5 Amer Moustafa, UAE
6 Hans-Rudolf Schalcher, Switzerland
7 Mphethi Morojele, South Africa
8 Chrisna du Plessis, South Africa
9 Holger Wallbaum, Switzerland

1 Hans-Rudolf Schalcher, Switzerland
2 Olivia la O’Castillo, Philippines
3 Gunawan Tjahjono, Indonesia
4 Wowo Ding, China; Head of jury
5 Momoyo Kaijima, Japan
6 Valérie Portefaix, China
7 Paul Hugentobler, Switzerland
8 Ashok B Lall, India
9 Uday Athavankar, India
Urban renewal and swimming-pool precinct  

Berlin, Germany

This project automatically qualified as a Finalist in the Global competition and was awarded Global Holcim Awards Bronze 2012. See page 24.
The Flussbad project is located in the center of Berlin and transforms an unused arm of the River Spree into a natural 745 m “swimming pool”. The facility is the equivalent of seventeen Olympic swimming pools with an average width of 28.8 m, water depth around 2.2 m, and features a 780 m-long reed bed filtration system. The renewal concept for the 3.9 ha site is as invigorating and hypothetical as it is realistic and simple in design. Parts of the Lustgarten quay wall are converted into generous stairs providing access to the swimming pool, with functional lockers and change rooms integrated unobtrusively into the terrain. Water entering the upper section of the river arm is purified through a 1.8 ha reed bed natural reserve with sub-surface sand bed filters. A barrage at the lower end of the system prevents the backflow of unfiltered water from the main body of the river, and overflow outlets for city’s mixed sewage network are channeled beneath the system. Since the fall of the Berlin Wall in 1989, the precinct has experienced a 75% increase in resident population and parallel loss of vacant space. The Flussbad right in the heart of Berlin’s historic city center on an unused river arm provides a public urban recreation space for both, residents and tourists adjacent to the UNESCO World Heritage site, Museumsinsel (Museum Island).

Project authors:
Tim Edler (pictured) and Jan Edler, realities:united, Germany; Denise Dih, DODK, Germany; Heiko Sieker, Ingenieurgesellschaft Prof. Dr. Sieker, Germany; Anna Lundqvist and Christian Bohne, Man Made Land, Germany

Comment of the Holcim Awards jury Europe
The jury commended this project due to its direct and very strong impact on the quality of urban life in an area of Berlin which has been previously overlooked. The project questions the ownership of the river itself that is currently used exclusively for shipping and drainage purposes but not for public activities. The idea of providing a public facility is convincing, feasible and easily transferable. It is complemented with an ecological concept that supplies unpolluted water and with a simple design that adapts respectfully to the historic context of the adjacent buildings. It is an excellent example of what could be achieved within challenging inner city areas that possess a rich tradition and cultural heritage where the local public has been overlooked.
City hall and civic center recycled from former factory

Oostkamp, Belgium
The aim of this project, initiated by the city of Oostkamp, 7 km south of Brugge, is to regenerate a former Coca-Cola factory. The 4 ha site is to be transformed into a new City Hall and Civic Center for the municipality with a population of 22,000. The key idea of the proposed scheme is not only to recycle the main construction and materials but also to reuse the space itself and its technical infrastructure. The coating of the building will be maintained and selectively gashed for illumination. Distinctive interiors made of glass reinforced gypsum (GRG) and recycled paper complement the layout of modular clusters that may be easily rearranged. The GRG bubbles are 7 mm thin, weigh only 7 kg/m² and are built in several layers on projected inflatable formwork, including a final layer of recycled paper for sound control and thermal insulation.

Project authors:
Carlos Arroyo and Vanessa Cerezo, Carlos Arroyo Arquitectos, Spain; Project development: Wolkenbouwer (Carlos Arroyo Arquitectos, Spain, and ELD Partnership, Belgium).

Comment of the Holcim Awards jury Europe
Beside its sustainable construction, the project was considered remarkable by the jury in terms of its social sustainability due to a participatory planning process, including the 170 council employees. The joint accumulation of the program, its process and the resulting design for the open main hall is an outstanding example for transparency in governmental architecture. All this is combined with simple but clever concepts for technical infrastructure that include spatial organization according to thermal zones (“thermal onion”) to reduce energy consumption, and effective deployment of natural lighting via a solar chimney and patio system. The project is very convincing: maximum effect through the least possible degree of technical intervention and minimal financial investment.
Lifestyle apartments and infrastructure recycled from former freeway viaducts near Scilla, Italy

This project automatically qualified as a Finalist in the Global competition 2012. See page 38.
The development of a new freeway that replaces the present one and its viaducts from the 1960/70s offers manifold potentials for handling the existing structures. Parco Solare Sud – Nests for European Snowbirds proposes a sensible conversion of one of the viaducts into vertical homes, 5 km east of Scilla in southern Italy. The homes are intended for European retirees attracted by lifestyle factors including the climate and breathtaking scenery overlooking the Tyrrhenian Sea. The vertical piles of the bridge are reinforced to improve their structural capacity, with horizontal platforms created to house living units, medical services, recreation and shops. It includes the usage of renewable energies including geothermal power based on hot dry rock technology. Rainwater is harvested; water from the geothermal system is recycled in the sanitation system; and, following use treated by phytoremediation and methanization. The Nests for European Snowbirds is a unique building that promotes the identity and attractiveness of the region with regard to its economy.

Comment of the Holcim Awards jury Europe
The jury endorsed this project as an excellent example of the smart transformation of an existing structure into a completely different use offering new economic chances to an up until now neglected region. Remarkable is the minimal footprint and the way the scheme efficiently makes use of the bridge’s supporting structure that is to accommodate the infrastructure and technical utilities. The fact that the bridge will not be demolished results in a positive material balance and reduces the overall expenses.

Project authors (from left): Tanguy Vermet, Off Architecture, France; Samuel Nageotte, Samuel Nageotte Architecture, France; Philippe Rizzotti, Philippe Rizzotti Architects, France. Not pictured: Manal Rachdi, Off Architecture, France.
High-density cottage garden structure

Appeltern, Netherlands
The edible Eathouse is a simple response on how to link urban space to green recreation areas and how to supply food with respect to its production — both matters of the socio-cultural quality of life. The Eathouse is an inexpensive modular system of plastic crates and scaffolding. It creates the potential for growing a greater volume of “urban food” in a particularly confined space. The crates are already used in the agricultural industry to harvest, transport and exhibit fruit and vegetables. Designed for a project in Appeltern, 25 km west of Nijmegen in the Netherlands, the structures could be positioned on a balcony wall, garden shed roof, or other under-utilized space.

Project authors:
Marjan van Capelle, Atelier Gras, Netherlands (left);
Marijke Bruinsma, De Stuurli Stedenbouw, Netherlands.

Comment of the Holcim Awards jury Europe
The jury identified the strength of the project was its extensive concept, which is as emblematical as it is concrete, and encourages discussions. The most important innovation of the project, however, is that by building the structure, the space consumed and withdrawn from agriculture will be more than compensated by using the façade and the roof to increase agricultural production capacity. Eathouse helps to improve the life cycle assessment and it is a convincing contribution to the design of the environment.
All prize winning projects in the regional Holcim Awards competitions 2011 automatically qualified for the Global Holcim Innovation prize competition 2012. This project was awarded the 1st prize. Read the appraisal of the jury from page 216.

High-efficiency concrete formwork technology

Zurich, Switzerland

Picture above: The wax formwork technology will enable the waste-free fabrication of double-curved concrete structures, such as the Crematorium Kakamigahara, but without the use of expensive and marginally-recyclable formwork. Photo©: Toyo Ito & Assoc. 2006.
The Wasteless Free-Form Formwork construction technology combines existing processes and materials in a new way to fabricate non-repetitive free-form cast-on-site concrete structures using re-usable and digitally-fabricated wax formwork. The re-usable wax formwork saves material and energy compared to milling expanded polystyrene blocks for single-use applications or using flexed sheets of material such as plywood which are limited to low curvatures. A robotically actuated free form mold is created forming a re-meltable wax negative which is placed on-site as concrete formwork. The process can be complemented through computer-aided manufacturing that improves the creation of complex shapes of aesthetically sophisticated applications. The technology enables complex and free-form geometries of contemporary architectural production to be fabricated using designs that are highly optimized in terms of material consumption, energy efficiency and usability.

Project authors (from left): Fabio Gramazio, Silvan Oesterle and Axel Vansteenkiste; Not pictured: Matthias Kohler and Ammar Mirjan, all Gramazio & Kohler, Architektur und Digitale Fabrikation, ETH Zurich, Switzerland.

Comment of the Holcim Awards jury Europe
Building upon technologies common in highly industrialized countries, the proposed scheme was praised by the jury for establishing a precise, economic and resource-efficient technique for the fabrication of free-form concrete structures. During the initial development phase the scheme works for dedicated construction concepts only, but has a high potential to be applied on a larger scale.
All prize winning projects in the regional Holcim Awards competitions 2011 automatically qualified for the Global Holcim Innovation prize competition 2012. This project was awarded the 2nd prize. Read the appraisal of the jury from page 218.

Low-cost apartments incorporating smart materials 

Hamburg, Germany
The design scheme addresses the future of the city of Hamburg as a high-performing and attractive 21st century metropolis. The brief for the Smart Material House required proposals for innovative building techniques and materials for a public housing project in a less developed neighborhood. The units range in size between from 90 to 225 m² and incorporate fast-growth fir decking slabs with prefabricated infra-lightweight concrete walls. The lightweight concrete is one-third of the weight of conventional concrete, is self-insulated utilizing recycled foamed glass as an internal aggregate and allows the building to approach a zero-carbon material effect. The walls are embedded with tube conduits to provide conductive heating and cooling via water, triple-glazing improves sound and heat insulation, and the roof is planted with local vegetation.

Project authors: 
Mike Schlaich, Technische Universität Berlin, Institut für Bauingenieurwesen, Germany (left); 
Frank Barkow, Barkow Leibinger Architects, Germany. 
Not pictured: Regine Leibinger, Barkow Leibinger Architects and Technische Universität Berlin, Institut für Architektur, Germany, Matthias, Schuler, Transsolar Energietechnik, Germany.

Comment of the Holcim Awards jury Europe
The jury identified the strength of the project in its innovative concept for construction and material that uses pre-fabricated lightweight-concrete elements which incorporate recycled foamed glass as an internal aggregate. On top of that is an overall design scheme with competent solutions for a public housing development in every relevant aspect – an ambitious design and a zero-carbon energy concept even in the context of lower-income communities.
Medium rise timber office building in low-to-no carbon emissions district  
Helsinki, Finland
The new headquarters of SITRA, the Finnish innovation fund, is part of an inner-city building complex that augments the urban redevelopment of the former Jätkäsaari docklands in Helsinki. The aim for the entire building complex is to establish a “sustainable living” and “low-to-no carbon emission” performance through participatory planning and design methods. The SITRA Headquarters at Low2No combines a variety of technical features that enhance user awareness and reduces weighted energy use to 45 kWh/m² per year, less than half the average Finnish requirement for heating and cooling. Civic amenities, including an auditorium, library and café, create a welcoming atmosphere for the public.

Comment of the Holcim Awards jury Europe
In terms of its construction and program, the office building is commended by the jury for achieving the aspired principles of transferability, transparency and inventiveness. All of the construction, even the cores and the prefab façade panels will be entirely in Finnish timber – globally an innovation for a 26 m 6-storey office building. Beyond these measures, the project has a successful holistic approach towards its design, connecting social, ecological, aesthetic and economical demands on a high level and it is thus an outstanding example of how sustainable architecture can be achieved on a larger scale.

Project authors (from left):
Juan Lucas Young and Andrew Kiel, Sauerbruch Hutton, Germany; Jan-Christoph Zoels, Experentia, Italy
Not pictured: Matthias Sauerbruch, Sauerbruch Hutton, Germany; Adrian Campbell, Arup, United Kingdom.
All prize winning projects in the regional Holcim Awards competitions 2011 automatically qualified for the Global Holcim Innovation prize competition 2012. This project was awarded the 3rd prize. Read the appraisal of the jury from page 220.

Efficient fabrication system for geometrically complex building elements

London, United Kingdom
Cast on Cast, efficient and sustainable fabrication process is focused upon the development of a smart but simple methodology to design and prefabricate building elements with complex geometries, which is resource efficient and considerably reduces construction waste. Complex geometries are utilized in contemporary architecture for the construction of concrete or mortar building envelopes, partition walls, horizontal and vertical shading elements and pavements. Building elements that are curved through all three dimensions can only be produced under current methods by using sophisticated formwork installations and highly industrialized prefabrication technologies at high cost. The proposed Cast on Cast methodology uses a parameterization system in which mathematical algorithms subdivide three dimensional elements into smaller components that can be stacked in towers. Furthermore the previous element is used to mold the shape of the subsequent element. This CNC controlled fabrication method relies on the consecutive process of casting elements using digital fabrication technology. These towers of elements are then transported to the site where they are detached and assembled into the desired spatial shape.

Comment of the Holcim Awards jury Europe
The jury commended this project which innovatively challenges new methods of designing and fabricating geometrically complex building elements and in addition provides efficiency improvements in terms of materials, storage, and transportation. Overall, the project presents a way that considers simultaneously the design of free and ambitious shapes, as well as the material efficiency and economy of constructions.
Materials reuse and regional transformation scheme

Gijón / Xixón, Spain
The RE-converting project incorporates multifaceted architectural tools and concepts to generate a sustainable society based upon minimal human impact while also providing energy, employment, and welfare conditions for the people who live, work and play in the new community. As a showcase for the re-conversion of many abandoned industrial sites, the project develops a detailed concept for a community on the site of a decommissioned shipyard in Asturias, Northern Spain. The concept re-uses building materials from abandoned industrial infrastructure and construction sites within 50 km of the site. The multi-generational spaces accommodate housing units and recreation spaces for children and elderly residents. Artisan dwellings are connected to workshop and retail spaces, and dwellings for residents working from home incorporate offices and shared working spaces.

Comment of the Holcim Awards jury Europe
Within the impressively detailed presentation, the holistic approach for a design and program that deals with social and environmental issues of de-industrialized sites was evaluated by the jury to be very convincing. It proposes a complex concept for the recycling of construction materials, reuse of existing building structures, reorganization of urban areas, and a bio-diverse regeneration of the urban landscape.
Bioluminescent devices for zero-electricity lighting

Seville, Spain
The concept proposes the design and fabrication of glowing devices that do not consume electricity through the manipulation of bioluminescent populations of microorganisms. A species of bacteria that naturally glows in the dark, Vibrio Fischeri, and a species of algae that glows when excited by movement, Pyrocystis Fusiformis, are tested to determine their suitability. The bioluminescent devices can be used for public ambient lighting, natural park illumination, billboards, highway posts and signs, and many other uses. The devices provide illumination without consuming electricity, and explore the opportunities of synthetic biology applied to architectural design.

Project author:
Eduardo Mayoral, Universidad de Sevilla, Spain.

Comment of the Holcim Awards Jury Europe
The jury was impressed by the visionary strength of the concept, with various criteria of sustainability applied and combined in a fascinating manner. Various employments of the technology prove the significance of the bioluminescent devices in terms of ambitious design, minimal energy consumption, minimal cost production, simple construction and numerous fields of application.
Regional food-gathering nodes and logistics network

Iqaluit, Nunavut, Canada

This project automatically qualified as a Finalist in the Global competition 2012. See page 44.
This socio-architectural project to create an Arctic Food Network (AFN) in Canada’s high arctic territory of Nunavut is a model to overcome the dependence of the Inuit community on expensive processed food products imported from the south. These foods have compromised the traditional diet centered on hunting and gathering of food provided by nature across a yearly cycle. The project responds to thorough research on the poor living conditions and health of the Inuit, and on the calendars, regional ecologies and transportation networks that are highly influenced by nature and tradition in these specific and extreme climatic and geographical conditions. The project intends to secure mobility between the scattered Inuit communities, allow a better distribution of local foods and serve as a series of bases for the reinforcement of traditional hunting – while also establishing new foundations for a sustainable, more independent economy. Snowmobiles using their pre-existing trails provide the only feasible form of ground connection. To accomplish this network, a series of small hub facilities is introduced along the tracks, acknowledging the Inuit tradition of temporary enclosure in a cold climate. These multi-functional structures provide shelter but also act as data transmission centers, ecological management stations, and cultural centers.

Comment of the Holcim Awards jury
North America
The jury praised the project for bringing an overlooked issue to the table, and providing a stunning solution with an impressive value-added return on the resources invested. An attentive contextual response is demonstrated in all dimensions of the project, based upon thorough research and the participation of the community. The entire strategy up to the design responds to the landscape, climatic and site conditions, and includes purposeful interventions which are integrated without any grand gestures or expensive structures. Instead they bridge between the traditions of the Inuit and the expectations of the young generation thereby providing an opportunity to create an improved future. The project is also highly transferable to other arctic regions, and its basis in terms of overall attitude and mood has even broader applicability.
Zero net energy school building

Los Angeles, California, USA

This project automatically qualified as a Finalist in the Global competition 2012. See page 50.
The public school project is designed as a prototype to be built on multiple campuses throughout Los Angeles. Its aim is an economical, flexible and yet, in its spatial concept, ambitious design that can be adjusted to different pedagogical models and learning styles. The two-level building can accommodate up to 500 students and may also be reconfigured for other communal functions. The sustainability concept intends to reach a net zero energy building standard and achieve LEED Platinum rating. Moreover, the authors believe in “the power of environment as our third teacher”. The construction comprises a “ready-made kit-of-parts assembled from off-the-shelf components”, which, in alignment with the prototype character of the concept, can be composed site-specifically. They include modular panels to create a double façade for solar, acoustic, and environmental control to achieve a climate-responsive solution on each site. Additionally, other state-of-the-art features are applied successfully to reach a fully integrated technical system. The prefabricated structural system allows a column-free interior, supplementing the desired flexibility. Secondly, it helps to reduce the duration of construction, traffic, waste, and cost.

Comment of the Holcim Awards jury North America
The jury was impressed by the thoroughly developed and comprehensively presented design, which manages the integration of a coherent technical and structural concept, yet retains spatial and conceptual simplicity. The promising approach for sustainability considers the full life-cycle of the structures including dismantling, and integrates a pragmatic concept for the use of renewable energy sources. The design approach has been successfully developed as an integrative and spirited aspect of the overall concept and achieves the desired spatial liberty, transparency between the inside and outside, and child-friendly atmosphere.

Project authors: Gloria Lee and Nathan Swift, Swift Lee Office, Los Angeles, USA. Not pictured: Peter Simmonds, IBE Consulting Engineers, Sherman Oaks, USA; Steve Ratchye, Thornton Tomasetti, San Francisco, USA; Tom Waldron, Butler Manufacturing Company, Santa Ana, USA.
Energy and water efficient border control station

Van Buren, Maine, USA
This project has an explicit function as a border control station on the US frontier to Canada, thus needing to meet a range of stringent regulations for safety, operation and durability and yet provide a welcoming appearance to visitors. Efficiency demands an enhanced capacity for visual surveillance to enable as few as two officers to operate the station. Harsh weather conditions during winter require a strong canopy roof to provide shelter for exterior control operations. Beyond the fulfillment of the technical requirements the project pursues a well-designed reconciliation with the landscape and regional cultural context, echoing the plot structure and verticality of the forests to develop the shape and aesthetically integrate the building. The remote location of the site, combined with an unusually large energy demand is met with a net zero energy goal, based on features such as a ground source heating and cooling, a solar wall to temper outside ventilation air, a ground-coupled heat pump, peaking biodiesel boilers, LED lights, and lighting control systems to reduce fossil fuel consumption, in addition to a water saving concept. Materials are selected for durability, appropriateness, recycled content and regional production. The exterior envelope consists of recycled aluminum, precast concrete and coated low-e insulated glass.

Project authors:
Julie Snow and Matthew Kreilich, Julie Snow Architects, Minneapolis, USA.

Comment of the Holcim Awards jury North America
The jury commended the project for the adroit synthesis of design and technology, successfully applying state-of-the-art features of sustainability in a government project with its regulatory implications. The design is dignified, simple and elegant. Instead of a “noisy” appearance it is well integrated into the context and creates the maximum spatial quality out of the rather simple program of the border station.
Energy efficient university building

Lawrence, Kansas, USA
The planning and construction of the design-and-build Center for Design Research is part of the University of Kansas architecture, design and planning curriculum. In a program that has been running for 15 years, graduate students enter a full-year course that traces the entire process of planning and construction up to realization. The current building project signifies a greater level of integration of sustainability into the long-running program and aims for LEED Platinum and Passivhaus certification. Form and function are aligned – with the structure serving as a design research center for interdisciplinary work between multiple schools, aiding the education of the university and community on eco-friendly strategies, material innovation and building efficiency.

Comment of the Holcim Awards jury North America

The jury acknowledges the project for its particular educative concept and the engagement with issues of sustainable construction illustrated in the program. The in-depth participation of students in the construction process is demonstrated as a successful component in the curriculum, substantially amplifying the learning outcomes beyond the pure experience of being a construction worker. Through the openness of the building’s function, this experience is shared not only with the few students who participate in the project – but is also transferred to the community and future students. The adoption of the building’s approach within the community is grounded by its integrative financial concept.

Project author:
Dan Rockhill, Studio 804, Lawrence, USA.
Energy neutral portable classroom  
Honolulu, Hawaii, USA
This portable classroom uses highly prefabricated modules that can be assembled to create different sized units on location in Hawaii and elsewhere. Its design and construction principle is optimized for this purpose, applying light materials such as steel, rigid foam sandwich floor, wood framing, double wall metal cladding, FSC-certified engineered-wood boards and natural finished recycled rice straw panels. The energy concept is based on a set of photo-voltaic roof panels and a ground-cooled water bag to cool water. A small windmill produces additional energy on site, while the roof design provides natural daylight and natural ventilation – thus minimizing energy consumption. In addition, all systems and performance criteria of the building are monitored and uploaded to an Internet site to support the exchange of knowledge. The Energy Neutral Portable Classroom utilizes a well-balanced strategy that establishes criteria to reach manufacturing and transport efficiency, and achieve low operating costs and ease of maintenance.

Project authors: Peter Anderson (left) and Mark Anderson. Not pictured: Johnson Tang, Brent Sumida, Christopher Campbell and Yevgeniy Ossipov, all Anderson Anderson Architecture, San Francisco, USA.

Comment of the Holcim Awards jury North America
The jury recognized the project for its sound general concept with an impressive teaching capacity. Through its potential for transferability, even to remote locations, the project delivers a strong contribution. With its spatial and functional qualities it directly supports education in the classrooms, and enhances the awareness for the systems by their direct visibility as well as the monitoring and Internet-publishing of performance.
Energy, water and waste efficient military installation

Fort Leonard Wood, Missouri, USA
The Integrated Living Community pilot project for an army base in Missouri is a case study for a 20 year master plan to change the planning of all 280 American military installations to a state of net positive energy, net zero water, and net zero waste. The project reflects the specific requirement of the military in relation to sustainability, with an additional motivation for independent systems to withstand disasters. The research led to a holistic strategy from road planning and master plan level to building design and incorporating a diversification in energy supply, water supply and waste disposal, focusing on reduction and renewable sources.

Project authors (from left): Angela Curtis, Lindsey Matetich, Sara Murphy, Kelli Polzin, Jennifer Ramirez, Greg Gilkison, Lyndsey Pruitt, Daniel Brauch, Andy Temeyer, Parker Sherard, Kenney Simmons. Not pictured: Cambrey Torres, Nathalie Westervelt, Tracy Dorgan, Keane Nishimoto, Eric Li, Cristin Szydlik, Keith Molina, Laura Ruf, Paul Szempruch, Martin Regner, Leslie Campbell, Matthew Valentine, Sean Beville, Ryan Murphy, Elizabeth Smith; all US Army Corps of Engineers, Washington DC, USA.

Comment of the Holcim Awards jury North America
The jury applauds the adaptation of sustainable planning and construction to the military field in general and moreover in this instance for the serious and profound strategy, based on an impressive multidisciplinary research. Due to security requirements, the concept may not yet respond to certain criteria of participatory approaches and the aesthetic approach remains specific to the site’s functionality. However, the jury appreciates the transparency to contribute research findings and exchange them with the civil world of research.
Environmental center and bird-watching facility using recycled materials

Chicago, Illinois, USA
Situated on a former production site in a historic industrial region outside Chicago, the center’s location was primarily chosen because of its position as important resting stop for migratory birds. The Ford Calumet Environmental Center serves bird watchers and as an educational facility, teaching about the region’s environmental past, present, and future. The starting point of both the design and construction principles is the idea to reuse materials available through the previous industrial function of the site that are found at local scrapyards and salvage suppliers — mimicking the birds’ behavior of collecting material to create nests. In the main construction and appearance, this tactic leads to an irregular mix of column dimensions “grouped together like twigs and rammed into the ground at inclined angles to form the building’s bundled column structure”. The same principle is followed throughout the building, including the use of slag and glass from broken bottles as aggregate in the terrazzo floors. The large deck functions as a bird observation platform and as an outdoor classroom — screened with reclaimed rebar steel which is visible to the birds to ensure they do not collide with the glass. Supplementing the construction strategy, the building technology applies passive solar power and geothermal heat pumps to minimize energy use.

Comment of the Holcim Awards jury North America
The jury acknowledges the maturity of the overall concept based on a fully integrated design, construction and technology principle. The surprising sourcing of the materials is a convincing strategy, perfectly matching the project, which possesses a dimension for repetition, at least as a principle for the awareness for resources. The careful approach to bird protection while encroaching into their habitat enables the protection program and is complimented by the educational capacity of the project.

Project author: Jeanne Gang, Studio Gang Architects, Chicago, USA.
Reinforced mangrove protective infrastructure  Miami, Florida, USA
This project addresses a strategy to strengthen mangrove forests along coastlines to reinforce the natural protection of the coastal communities against the threat of tsunamis. This issue with global relevance is taken up with Miami as a case study. The project shows the high capacity of the plant structure to break down the wave's energy in comparison to vertical walls. To help the reestablishment of mangrove forests and to upgrade the defensive strength of the trees an approach using biomimicry is proposed, copying the structure of the mangroves’ roots. The Reinforced Mangrove Protective Infrastructure at first serves as planting ground for the mangrove seedlings and their protection while growing, secondly the structures supplement the defensive power of the plants against waves. The project provides habitat for the mangrove forests and by extension also for seagrass, coral, fish and shellfish. A supplementary benefit of the re-introduction of the mangrove forests is their filtering capacities for urban and agricultural runoff and their quality as habitat for many species.

Comment of the Holcim Awards jury
North America
The jury was impressed by the simplicity yet powerful intervention with global relevance. The reinforcement of the mangrove biotope and its function as natural shelter has a multiple positive impact in regard of sustainability. The project postulates an approach that aids in securing communities on the coastal fringe, creating natural beauty to coastal zones, and developing habitats. The proposed structure is low in cost and is of great financial advantage in comparison with the costs for damages it may prevent.

Project author:
Keith Van de Riet, Rensselaer Polytechnic Institute (RPI), Troy, USA.
Temporary festival structure using recyclable building components  Providence, Rhode Island, USA
This small construction project explores the reintroduction of the ancient phenomenon of “Sukkahs”, temporary structures, biblical in origin, ostensibly used for one week as a dwelling during the Jewish holiday of Sukkot. The basic principles of the small structure as an ephemeral, translucent and not fully enclosing hut are taken up in the Shim Sukkah as a wooden structure relying on one material and construction element – prefabricated stacks of cedar shims. Uniquely, this secondary construction material, commonly used to fill small gaps or spaces between objects, becomes the main feature of the construction, providing the needed shelter and capacity for rather easy dismantling and reconstruction.

Comment of the Holcim Awards jury
North America
The jury commended the project for the immediate concept of the built structure, but moreover for the fundamental research on the complexity of processes, focusing on the construction and its effects, the relation of material, light and thermal effects. Many principles of sustainable construction are directly or indirectly selected as subject or applied, yet in microcosm and as a theoretical object. The research has been transferred into an object of stunning aesthetic quality and shows great sensibility for its construction material.

Project authors (from left): Stephanie Gunawan, David Getty, and Matthew Jacobs, all Rhode Island School of Design, Providence, USA.
Foam concrete utilization research

Toronto, Ontario, Canada
This material science project studies the building properties of foam concrete and the potential for wider use of the material in architecture and construction. The project raises some fundamental questions regarding concrete, yet seeks realistic solutions for practical application. It is driven by the general advantage of foam concrete to reduce the consumption of material and other resources (principally cement and energy). Another Side of Concrete reintroduces the utopian vision postulated by 1920s Modernists that “mass consumption of concrete possesses the power to encourage social progress on a global scale.”

Project author:
Przemyslaw Latoszek, University of Toronto, Toronto, Canada.

Comment of the Holcim Awards jury
North America
The jury recognizes the broad approach toward the seemingly only pragmatic and business-related question of material science in general and the concrete production in particular. In a clear manner the project extends into a number of parameters beyond its own discipline to explain the wide impact of the issue – the social, financial and environmental dimension. Even though the concept of magnetic formwork was questioned, the research on the application proves a high degree of transferability and the potential for an effect on aesthetics in the built environment.
Urban remediation and civic infrastructure hub

São Paulo, Brazil

This project automatically qualified as a Finalist in the Global competition and was awarded Global Holcim Awards Silver 2012. See page 16.
This project for a multifunctional public building, Grotão – Fábrica de Música (music factory), is located in Grotão in the heart of the Paraisópolis favela of São Paulo. With more than 100,000 inhabitants, it is one of the largest informal communities worldwide. Like many favelas, and despite its unusually central location, the area is effectively separated from the formal city and its social and cultural infrastructure. In addition, due to the informal development and the area’s topographic and geological conditions, the site is characterized by increased erosion and dangerous mudslides. The project takes up both of these key challenges, building on intense community participation. The challenging topography is retained and stabilized to prevent further erosion, creating a natural arena in a terraced public space and including a precinct for urban agriculture. Different low-tech features are proposed. A water management system is introduced to use rainwater on site and reuse grey-water. An integrative system for the active and passive use of ventilation, cooling and air conditioning makes use of both, the building and the amphitheater construction. In its vertical structure, the building itself offers various spaces for the music school, including a small concert hall, and also sports facilities, public spaces, and transport infrastructure.

Project authors: Alfredo Brillembourg (left) and Hubert Klumpner, Urban-Think Tank (U-TT), Brazil.

Comment of the Holcim Awards jury Latin America
The jury appreciated the holistic approach, integrating all dimensions of sustainability on macro and micro scales. The urban approach of creating a vertical density within the low-rise sprawl of the favela, and allowing public spaces around, under and within the building, is of high quality. Through its integrative concept and introduction of cultural “high end” facilities with architectural quality, the project has the potential to contribute to an enrichment of social awareness and cohesion in the area. Furthermore, the appropriate application of technical features is of an exemplary and educative character. Grotão – Fábrica de Música was commended for its highly integrated involvement of the local community in a “bottom-up” planning and management approach.
Sustainable post-tsunami reconstruction master plan

Constitución, Chile

This project automatically qualified as a Finalist in the Global competition 2012. See page 62.
This master plan was developed after the 2010 earthquake and tsunami that struck Constitución, a city of 46,000 people located on the shore of the Pacific Ocean and 300 km southwest of Chile’s capital, Santiago. The 8.8 Earthquake Chile – Sustainable reconstruction master plan proposes a strategy to respond with “geographical answers” to the “geographical threats” of the earthquake and tsunami risk. Instead of considering a construction ban or a massive barrier along the risk zones, the project proposes to plant the flood-prone areas in order to break the waves. Located behind this first line of defense are facilities that have specific restrictions on the use and layout of ground floor areas. These two interventions are accompanied by an evacuation plan as the third protection element. The aim is a long-term preservation of the city at its historical position next to the estuary mouth—a strategic location for the city’s economy. The complimentary concept is to create public open spaces along the banks of the river that alleviate the lack of inner-city recreation areas as well as support the dissipation of rainwater runoff in order to avoid further flooding.

Comment of the Holcim Awards jury
Latin America
The jury values the thoughtful approach of proposing a long-term strategy of upgrading the built environment rather than implementing an ad hoc action plan to reconstruct that which had been destroyed by the tsunami and earthquake. Furthermore, the project’s effective establishment in the social community through citizen participation was recognized, demonstrating the contextual and social sensitivity of the master plan.

Project authors (from left): Alejandro Aravena, Juan Cerda and Diego Torres, Elemental, Chile. Not pictured: Gonzalo Arteaga, Fernando García-Huidobro and Cristián Martínez, Elemental, Chile; Alejandro Gutiérrez, Arup, United Kingdom; Eugenio Tironi, Tironi Asociados, Chile.
Urban regeneration master plan

Ciudad Juárez, Mexico

This project automatically qualified as a Finalist in the Global competition 2012. See page 68.
The project is part of a general strategy introduced by the Mexican federal government for Ciudad Juárez, a city of 1.5 million people on the US-Mexican border, which with El Paso forms one of the world’s largest bi-national metropolitan areas. The city is located in a strategic position for drugs and arms trafficking and suffers from increasing levels of violence as the current administration’s efforts to curtail the drug trade are strongly resisted. “We are all Juarez!” – a strategy including more than 150 commitments, intends to radically improve the city’s social, economic, and physical conditions. A component of the strategy is the Resilient Public Spaces Master Plan for the northwest sector of the city, which works at various scales and uses a multifaceted approach. It is based on the consolidation of existing water retention basins to mitigate future flooding, and their conversion into public spaces. Different facilities are introduced including agricultural terraces, workshops, commercial lots, playgrounds, sporting facilities, a skate park and progressive housing units. They provide space for economic, educational and recreational activities with the overall intention to strengthen community networks.

Comment of the Holcim Awards jury
Latin America
The jury was impressed by the thoughtful and uncomplicated approach. The project has a great potential not to remain a singular action, but generate an impact for the local communities and neighborhoods and thus the entire city on an urban scale. Highly appreciated elements were the versatile focus, the inclusive approach to community workshops and NGOs, as well as the high aesthetic quality which validates the entire action of reuniting the society.
Ecological awareness and recreation reserve

Banderrilla, Mexico
The intention of this large-scale project is to save an area of more than 50 ha of the Mountain Cloud Forest in the municipality of Banderilla, adjacent to the state capital of Xalapa in Veracruz, Mexico. The forest is at risk from the urban encroachment pattern of the city. The project aims to ensure that the physical, ecological and economic capital of the site are enhanced and remain sufficiently robust for further adaptation over time. To reach beyond the protection of the existing ecology, the master strategy of the Ecology Center “La Martinica” activates the entire forest as an educational space, punctuated by a range of facilities and new buildings at varying scales. The facilities are offered both for short-term visitors and for long-term users. They comprise a lookout tower and a museum, and landscape elements with a recreational, agricultural or educational focus.

Comment of the Holcim Awards jury
Latin America
The jury welcomed the integrative concept, connecting landscape and architectural intervention with an educational dimension. Even though the constructions have no significant innovation, the buildings provide an appropriate grade of self-confident design and integration into the landscape at the same time. A further quality seen by the jury is the pragmatic realization of the approach, shown in the scheme in general and the proposition in regard to phasing and financing in particular.
Green university library  
Santiago, Chile
This university library project continues from earlier building works to construct the private non-profit Diego Portales University. Founded in 1982, the university in central Santiago has more than 1,300 academic staff and 11,000 students with nationally-recognized programs in business, law, psychology and journalism. The design meets the demands of the dense situation with a multi-floor layout and elements that bring additional natural light and fresh air into the building or provide retreat spaces such as the green roof. With both reflecting materials and intense planting, an inner courtyard functions as light shaft. The most visible feature of Central Library Diego Portales University is a green street façade, which functions as a solar filter – while the same time enhancing the “green” credentials promoted by the university. The building will be the first in Chile to meet the LEED Gold certification standard.

Comment of the Holcim Awards Jury
Latin America
The jury applauds the high quality of the design and the ambition to blend purist architectural language with environmentally friendly components. The sound finance plan, especially the concept of transparent financing has a great innovative quality. The strongest element of the approach is the interaction of the building with the city through its well-articulated transition spaces.

Project author:
Mathias Klotz, klotz y asociados, Chile.
Library with integrated community outreach  
Rosario, Argentina
The Trojan Library project was initiated by the municipal government of Rosario in response to the nation’s poor results in a 2009 worldwide evaluation of 15-year-olds in mathematics, science and reading. The strategy provides both the infrastructure of the library and a vast network of supplementary activities to generate flow-on use of the facility in Argentina’s third largest city with a population of 1.2 million. To achieve this goal in addition to the core function as library, a number of supplementary activities are proposed that take up the challenge of attracting potential library users from the 150,000 working-class inhabitants of the precinct. The suite of socio-cultural services incorporated into the design includes sporting facilities, a cinema, skate park, station for the city bicycle system, childcare center and dance studios. The project proposes an economy of means via a simple structure with modular character, as well as an appropriate application of technical features and materials aligned with the frugal approach of the project.

Comment of the Holcim Awards jury Latin America
The jury recognizes the mature quality of the overall project and its well-balanced architectural contextual qualities. The thorough study of the needs of the future users is seen as its strongest element together with the elegant transcription of modesty into the architectural language, using a simple plywood frame construction that creates a highly suitable human atmosphere.

Project authors:
Gaston Ateiman (left) and Alfredo Tapia. Not pictured: A team of 18 additional architects and engineers, all AFT Arquitectos, Argentina.
Recovery of rail transport network  Oaxaca Valley, Mexico
The project’s idea is the regeneration of the disused rail transport network in the valley of Oaxaca – one of the poorest states of Mexico. The rail system had been an important transport element for more than a century until the tracks were decommissioned in the 1990s after the urban area had grown. Facing the challenges of the future, the project proposes to insert a new electric low-floor train system to provide a safe and high quality public transport system that increases mobility in the area with little environmental disadvantages and reduces the dependence on individual transport. The system will provide short- and medium-distance public transport for more than 700,000 people. Beyond this practical function the project will stimulate the region with a vision for a “cleaner, healthier and safer future”. To integrate the regional rail network into the urban fabric, bicycle facilities are proposed for the rail stations as well as a bikeway system along the rail corridors.

Project author: Gustavo Madrid Vazquez, espacio entre tiempo Architects, Mexico.

Comment of the Holcim Awards jury
Latin America
The jury acknowledged the promising and clear traffic concept and its integration into an urban strategy. The feasibility of the concept is obvious as it takes advantage of the existing land ownership of the infrastructure corridor. Where the architectural potential of the project could be more developed, the strength of the technical strategy is recognized.
Urban transit corridor and river remediation master plan  
Mexico City, Mexico
Taking Mexico City as a tangible study case, *Regenerating La Piedad River* reflects on the growth of mega cities and societies’ reliance on individual motorized traffic systems, leading to the environmental degradation of ecosystems worldwide. What is intended is the regeneration of living systems to perpetuate self-renewing patterns instead of their contamination and rapid degradation — proposing a fundamental change in society’s relationship with the environment. The river was enclosed in pipelines and heavily degraded with sewage, buried under traffic-choked roads. For Mexico City, the master plan promotes the regeneration of living systems and an integrated mobility strategy for the metropolis and its watershed, the Anáhuac Basin. For the Rio La Piedad the project suggests the conversion of roads into linear parks accompanied by efficient public transport (BRT: bus rapid transit) and cycle routes.

Comment of the Holcim Awards jury
Latin America
The jury was fascinated by the visionary strength of the project, pointing to a fundamental issue of today’s metropolis, based on a sound study of Mexico City’s history and current demands, calling for strategic debates. Beyond the theoretical approach, practical proposals are elaborated, how the spaces currently used for roads could be redesigned into green corridors.

Project authors: Lucie Nguyen and Delfín Montañana. Not pictured: Elias Cattan, David Mandujano and Miguel Mercado, all Taller13 Arquitectura Regenerativa, Mexico.
Energy self-sufficient water desalination facility
Córdoba, Argentina
The concept, SED – Water Factory, responds to the scenario of the breakdown of the global system based on the trajectory of current ecological, economic and social crises. It then questions the role of architecture in this kind of future. As its basis, the project depicts a positive turnaround with the beginning of a new cycle – beginning with action, evolution and innovation, reaching for a more sustainable architecture. As a key subject, the issue of water supply is elucidated and the use of environmentally-friendly desalination plants based on natural methods is explored. The concept then considers the efficacy of an architectural application for raising awareness and educating communities about the issue. What is proposed is an offshore plant module, potentially even transportable, serving cities, in crisis regions, at temporary events, and thereby providing auxiliary infrastructure.

Comment of the Holcim Awards jury
Latin America
The jury was impressed by the comprehensive and broad approach and strong visionary quality of the project. The daringness of the project was appreciated, to risk the controversial question of accepting a scenario with a pessimistic basis that leads to potentially catastrophic consequences for the urban landscape. Raising this utopia, the project shows in an intelligent way that a careful integration of technological, social and aesthetic components can lead to optimistic perspectives.

Project authors:
Mauro Ivan Barrio (left) and Matias Damian Martin, Universidad Nacional de Córdoba (UNC), Argentina.
Holcim Awards “Next Generation” 2nd prize 2011 Latin America

Reinvigorated waterways for transportation and sustainable development

Puerto Suárez, Bolivia
The project is designed for the UNESCO World Heritage listed Pantanal Conservation Area, a complex landscape encompassing 200,000 km² of lakes, rivers and wetlands in the border area between Bolivia, Brazil and Paraguay. The strategic importance of the area for the South American interior is identified, both through an investigation of its potential as a transportation route between the ocean harbors and the inland, and as living space for those who have limited options to develop their livelihood. As a starting point, Interior South explores the potential to harness the water, which floods up to 80% of the land area during the wet season. Then, core elements are proposed, serving as floating units for production, living, trading and teaching.

Comment of the Holcim Awards jury
Latin America
The jury commended the project for its holistic approach from large scale to micro-level details such as social issues; and its realistic approach to a transnational project. Within that, the integrated thinking of the production-market-education line and the social impact are particularly important contributors to the quality of the project.

Project author:
Martin Fernández de Lema, Universidad de Buenos Aires, Argentina.
Densification and upgrade of university buildings

Rio de Janeiro, Brazil
The disorder within the university campus of the Pontifícia Universidade Católica (PUC) in Rio de Janeiro and the lack of space initiated the Binding Infrastructure: Expanding the University’s Capacity project. The relocation of a parking area that today disturbs the entrances to the campus to an unused roof slab of a tunnel is the first component of the project. The second and major intervention is a new structure, connecting and thus upgrading two existing buildings in the same entrance area of the campus. This multistory structure shall also serve as a symbol, demonstrating togetherness by linking not only the two existing major structures but also the new parking facility.

Comment of the Holcim Awards jury
Latin America
The jury found the general approach of the project convincing, densifying the campus on the one hand and creating new public spaces on the other. The necessity of handling existing structures is a theme of high value, particularly because the project dares to deal with well-designed buildings. The claim of promoting simplicity is well presented in the strategy, yet certain appropriate technical proposals are made. The design also responds successfully in terms of the site's context with a strong architectural language.

Project authors:
Gabriel Kozlowski Maia (left) and Pedro Chianelli Salgado Dieguez. Not pictured: Maria Labarthe, all Pontifícia Universidade Católica (PUC-Rio), Brazil.
Secondary school with passive ventilation system

Gando, Burkina Faso

This project automatically qualified as a Finalist in the Global competition and was awarded Global Holcim Awards Gold 2012. See page 8.
This school project in one of the world’s poorest countries aims to provide further education to the inhabitants of a rural area. Gando, with a population of 3000, has no secondary education facilities and lies on the southern plains of Burkina Faso, some 200 km from the capital Ouagadougou. Diverse design aspects of the project consider the challenging weather conditions where summer temperatures peak at 35 degrees. The natural ventilation cooling effect is enhanced by routing air through underground tubes, planting vegetation, and the use of double-skin roofs and façades to achieve a 5 degrees thermal reduction. The enhanced indoor comfort and conditions are far more conducive to education. Energy consumption during construction and operation is reduced to a minimum using only the sun and wind. The collection of scarce rainwater is integrated into the planting concept and is used to irrigate newly-planted trees that are intended to help consolidate previously exploited vegetation. Completed projects including an elementary school and library contributed to the evolving research and development process concerning design concepts, technologies and materials.

Comment of the Holcim Awards jury Africa Middle East
The jury commended this project because of its broad approach towards enmeshing discreet sustainable aspects of the program into a comprehensive whole. The Secondary School Gando is constructed by the local community and builds not only a series of structures, but also a sense of identity and enhanced social cohesion. Its “urban design” has the potential to act as an anchor point in the village structure. The project, as one element of a long-term school development, makes use of “high-tech” ideas that are implemented with low-tech means. It intelligently leverages the site’s characteristics and locally-available materials. The project itself generates positive impacts upon both the social environment by generating opportunities for education, creating jobs and training; and on the natural environment through reforestation. People learn building skills using clay and other readily available local materials, which strengthens the idea of a mutually-beneficial process since the skills learnt can be applied beyond the confines of the site. The experiences and techniques partially applied to earlier projects realized independently on the same site were integrated, and prove the potential and applicability of the project’s inherent ideas.
Sustainable refurbishment of a primary school near Al Azarije, Palestine

This project automatically qualified as a Finalist in the Global competition 2012. See page 74.
The challenge of this project is to remain effective in a zone of political tension in addition to addressing climatic and local constraints. The refurbishment of the Abu Hindi Primary School of the Bedouin community is located five kilometers south-east of Al Azarije (Eizariya), near Ma’ale Adumim and less than 10 km east of Jerusalem. The project achieves climatic comfort and energy sustainability by improving natural ventilation and thermal insulation while at the same time generating a positive impact on the students’ perception of their everyday school life. Traditional mud brick techniques used in other regions of the world are adapted by local artisans in an innovative way, resulting in climate balancing and easily produced building modules. The new sandwich panel roof is tilted and raised to create efficient air circulation and natural daylighting. The use of basic local resources allows an import-independent construction while also reducing energy demands for transportation and production.

Comment of the Holcim Awards jury
Africa Middle East
The jury appreciated the approach to refurbish an inadequate existing structure and to upgrade it with well-directed and precise low-tech measures to a functional educational unit. Rapid construction over only two months enabled the project to be conducted exclusively during school holidays and confirmed the feasibility of the concept. Arising from disadvantageous parameters, a number of benefits such as long-term improvement of educational conditions, generation of local labor and know-how as well as a strengthening of social community are achieved, moreover resulting in differentiated and accomplished in- and outdoor spaces. The simplicity of the underlying concept, its elaboration and realization, and easy transferability make this project a remarkable blueprint.

Project authors:
Claudia Romano (pictured), Diego Torriani, Alessio Battistella, Luca Trabattoni, Carmine Chiarelli, Valerio Marazzi, and Alberto Alcalde Villacampa, all ARCò, Architettura e Cooperazione, Italy.
Training center for sustainable construction  Marrakesh, Morocco

This project automatically qualified as a Finalist in the Global competition 2012. See page 80.
The design approach for this training center in the Marrakesh satellite suburb of Chwiter concentrates on the use of nearby resources including the workforce and earth as the primary construction material. These principles are enhanced by combining design-inherent shading and natural ventilation with modern technologies such as heat pumps and solar panels all of which enable low energy requirements in both construction and operation. All electrical energy requirements are generated by 333 m² photovoltaic panels, wind operates the ground heat exchanger and transports water-cooled air into courtyards and gangways. The design, referring to Moroccan archetypes, creates a well-balanced distribution of aesthetic in- and outdoor spaces that, embedded into the urban surroundings, offer a spatial benefit to the community. A high proportion of Moroccan youth are disadvantaged by unemployment and illiteracy. This vocational training center enhances their future prospects by providing practical education and vocational qualifications. The Teaching and Training Center Chwiter generates opportunities for employment using sustainable practices in the prospering construction sector.

Comment of the Holcim Awards jury Africa Middle East
The jury considered the strength of the project to be its approach of merging the pedagogic concept with the building itself by making the construction a showcase of both preservation and advanced development of cultural knowhow in local craftsmanship: different earth and wood construction methods as well as local ceramics and gardening are integral parts of the building complex demonstrating broad local resources and new technologies to the trainees. The essential idea and implementation methodology of this project has the potential to become a model for Morocco and other regions of the world.
Affordable building materials from recycled agricultural waste

Zaria, Nigeria
This materials development project succeeded in processing agricultural waste into low-cost construction panels bonded with tannin-based adhesive. Plant-based agricultural wastes from the cultivation of rice, maize and cassava crops provide natural fibers that are a sustainable resource for the production of building materials to achieve a reduction in construction costs, reducing dependence on imported, higher-cost alternatives. The panels are an affordable building material for housing economically disadvantaged communities and help to improve rudimentary living conditions. Diverting crop byproducts from the waste stream produces positive environmental side effects since waste incineration and considerable air pollution are avoided. The building material provides a tangible contribution to reducing the estimated deficit of 17 million low-cost dwellings in Nigeria alone.

Comment of the Holcim Awards jury
Africa Middle East
The jury considers this project a remarkable approach to ameliorate through one innovation a number of current challenges experienced in developing regions in the world. The new building material creates additional uses for local resources, turns the former burden of waste disposal into a supplementary income stream for local farmers, and reduces dependence on expensive imported alternatives. In addition, the material has the potential to create a new industry, strengthening economic independence and a potential export. Beyond this, the product’s characteristics will provoke unique design responses.

Project authors (from left): Sani Murtapha and Mas’ud Abdulkarim, Ahmadu Bello University (ABU), Nigeria; Charles Oluwole Job, Architecture, Wood & Civil Engineering, Bern University of Applied Sciences (BUAS), Switzerland; Okey Nduka, University of Nigeria, Nigeria. Not pictured: Heinz Müller, Frédéric Pichelin and Andreas Rosenkranz, BUAS, Switzerland; Henry Tata Kimeng, ABU, Nigeria; Chigbo Aghaegbusi Mgbemene, University of Nigeria, Nigeria.
Building implementing holistic architectural design

Masdar City, United Arab Emirates
The Swiss Village Sprinter Building project located in the exceptional Masdar concept city in Abu Dhabi integrates itself into a larger surrounding that claims sustainability as precondition. All steps of the design technique integrate state-of-the-art computer aided simulation processes where, for example, building shape is optimized to use the prevailing winds for natural ventilation and minimize solar gain. The construction approach is balanced with local traditional design principles and methods, such as applying high building density, integrating solar chimneys and the use of locally available rammed earth techniques. Passive measures are well balanced with integrated active components such as chilled beams to reduce energy consumption (55% below Ashrae Baseline). Construction and supply chain processes were optimized with detailed consideration of local conditions.

Project authors (from left): Bob Gysin, Rudolf Trachsel and Sebastian El Khouli, Bob Gysin + Partner BGP Architekten, Switzerland; Not pictured: Nadja Heitz, and Carmen Held, Bob Gysin + Partner BGP Architekten, Switzerland; Tim Hampson and Mark Barnard, Dyer, United Kingdom; David Telford, hurleypalmerflatt, United Kingdom; Markus Braach, Switzerland; Upul Jayasuriya, Milcris, Oman.

Comment of the Holcim Awards jury 
Africa Middle East
The jury acknowledges the building’s design approach to be “sustainable by design”: sustainability being an architectural quality that emerges when a building responds to and integrates its social and physical environments in the development of its form and function to make effective and efficient use of resources. The project is an example of a holistic sustainable approach applicable in climatically challenging but technically sophisticated environments.
Sustainable public eco-tourism facility

Cape Town, South Africa
Located in the UNESCO world heritage Cape Floral Region, the Oudebos Mountain Camp replaces an existing facility and aims to provide reconcilable facilities for sensitive eco-tourism. The project consists of five self-catering cabins and a small function room which are lightweight, stilted structures that integrate modestly into the surroundings. Renewable materials such as local or recycled wood and further recycled materials are used for the insulated construction, which in large parts consists of elements prefabricated off-site. Operationally self-sustaining, local water resources are restrainedly used; energy consumption is minimized through the use of low energy systems. Wastewater is avoided by means of self-composting toilets and low-flow showers.

Comment of the Holcim Awards jury
Africa Middle East
The jury acknowledges the strength of this project lies in the consistent implementation of its initial idea to minimize impact on this valuable biosphere and to rehabilitate natural conditions on the previously operated site. The Kogelberg Biosphere Reserve is home to the most complex biodiversity on the planet, and as a contextualized feature the Oudebos Mountain Camp is a commendable example for good practice of balancing tourist needs and preservation aspects. The project offers a thoughtful approach to building design and showcases durable, recyclable, and renewable materials, and through energy-efficient design extrapolates the visitors’ experience of the reserve to the structural level.
Urban precinct reconstruction and rehabilitation  

Fez, Morocco
The underlying goal of the Place Lalla Yeddouna project is to revitalize an historic hub in the urban structure of Fez’s UNESCO World Heritage medina (old town) with new constructions and cautious conservation of valuable historic buildings. The urban design embraces the previously negated river and renders it a determining urban element offering space along the river for social interaction. The place itself and its surroundings are woven into the urban fabric through well-composed sequences of open spaces. Passive environmental strategies include shading, natural ventilation and thermal mass. Heavy pollution of the river and its fringe caused by the current activities will be reduced to a minimum. A balanced mixed use addresses local residents as well as tourists developing a mutually-beneficial interplay.

Project authors: Michel Mossessian (left) and José Marquez, mossessian & partners, United Kingdom. Not pictured: Yassir Khalil, Yassir Khalil Studio, Morocco.

Comment of the Holcim Awards jury Africa Middle East
The jury recognizes that the transformation of this unique yet particularly neglected site on the banks of Fez River will not only contribute to the built environment but will also improve the poor labor and economic conditions of the native copperplate and leatherworks artisans that dominate the site. It is expected that the improvement of this site will become a catalyst for the development of surrounding areas with positive social impact that will not end at the site’s boundaries.
Adaptive re-use of industrial site for urban agriculture  Pretoria, South Africa
The Vertical Agriculture at the Old Pretoria West Power Station project transforms a soon to be decommissioned coal bunker of a power station into a vertical hydroponic garden, thereby inverting the attributes of a former polluting facility into a purifying element that continues to be a mechanism for supply of the city’s needs. Grey- and rain-water is used to grow food in close proximity to the urban consumer. Spin-offs become resources: gas and biomass for energy production in addition compost and clean water. To establish the necessary framework for the transposed use, the crude existing structure hosts bamboo construction, exploring its limits in multi-floor commercial application. Moreover qualitative spaces are created in the former barren area upgrading the built environment, the intended market at the base forms a place of social exchange. Urban agriculture knowledge is transferred to the local community and the adaptive reuse generates numerous products (food, compost, gas, clean water) and provides a strong return on investment.

Comment of the Holcim Awards jury
Africa Middle East
The jury commended this project because of its visionary idea and impact that appears both feasible and constructible. The utilization of abandoned industrial structures will become an increasingly relevant issue in societies that are transitioning to the tertiary sector.

Project author:
Calayde Aenis Davey, University of Pretoria, South Africa.
Passive floodplain agricultural system

Gohatsion, Ethiopia
Helix structures 100 m in diameter made of concrete and steel are positioned into the Nile River canyon. With 90% of the water and 96% of the transported sediment carried by the Nile originating in Ethiopia, the agricultural system collects the fertile soil the river carries during the flood season. Computer analysis of water flows and dynamics optimize the capture of sediment onto the structure. During the dry season, the towers emerge from the water and lay open the soil for cultivation. Various crops including potatoes, corn, cucumbers, spinach, roses and tulips are grown on various levels of the structure depending on the number of days the section is above the water level. As the structures are fixed, maintenance will be low. The *Resurrection of Ancient Agriculture* concept proposes an alternative to the construction of large scale dams that generate political and economic instability in the region.

Comment of the Holcim Awards jury Africa Middle East
The jury considers the striking essence of this project to be that it re-invents, in a visionary and innovative way, the cultivation of Nile waters and soils that have ensured nutrition and prosperity for the sharing countries for millennia. The idea is simple and impressive. It may allow countries now insufficiently profiting from the valuable river resource to lower dependence from importing artificial fertilizer and to improve food security.

Project authors: Gunho Kim (left) and Wonjaon Han, University of Seoul, South Korea.
Culturally-sensitive urban master plan

Agadir, Morocco
The abandonment of Agadir’s Inbiaât Stadium has drained the lifeblood of the precinct and initiated the idea to redevelop the adjacent wasteland in between the beach and the city center. The result is the Agadir Connection concept to support urban development and upgrade facilities on the fringe of the city center. Architectural, landscaping and urban design interventions transform the previous transit space into an attractive living zone and space to rest. The complex is self-sufficient in terms of energy, and reintroduces local species of trees to replace introduced species that degrade soil fertility. The master plan elements ranging from macro to micro scales altogether form an interrelated whole.

Comment of the Holcim Awards jury
Africa Middle East
The jury identified the strength of the Agadir Connection project lies in its broad approach and a scientifically-based evaluation, thus leading to a convincing project idea. The basis for the theoretical development is the identification of deficiencies and expectations by inhabitants and a wide range of local bodies.

Project author:
Khalid El Jaouhari, ENA Rabat National School of Architecture, Morocco.
Locally-manufactured cob and bamboo school building

Jar Maulwi, Pakistan

This project automatically qualified as a Finalist in the Global competition 2012. See page 86.
This school project in the small village of Jar Maulwi, 35 km northwest of Lahore, is an extension of the existing school, which has provided education for underprivileged rural girls for more than ten years. The new two-story building, Earthen School Tipu Sultan Merkez, constructed from locally-sourced cob and bamboo will provide seven new classrooms. Mitigating earthquake risks, the structure is divided into two compact parts connected by a light gallery. The 60 cm thick ground floor walls are made of cob, a mixture of clay, sand, straw, water and earth and supported by brickwork foundations which protect against moisture ingress from the soil or rainwater. The upper floor is a bamboo construction with an earthen filling. Intense research on cob construction resulted in a useful increase in strength and durability, and extended maintenance intervals compared to former methodologies. The high humidity absorption capacity and significant mass of the earth walls reduce interior temperatures by up to 8 degrees during summer where temperatures exceed 40 degrees. South-oriented glazing produces solar gain during winter. The local residents build the school and are thereby educated in this improved approach which creates an opportunity to establish their own local enterprise and transfer this highly appropriate construction technology to other building projects.

Comment of the Holcim Awards jury
Asia Pacific
The jury commended this project because it contributes to all of the competition’s “target issues” in a convincing way. Through engineering and design, a traditional building technology has been upgraded with effective low-tech measures. Bamboo is used in an innovative way, demonstrating the potential in construction of this fast-growing and widely available material, which also counters deforestation. The propagation of the new construction methods amongst the local population aids the establishment of local businesses and improves the economic situation in this rural area. All materials are locally sourced and can be processed with low energy requirements. The new construction approach shows the rural population an affordable, high quality and durable alternative compared to widely-used, but higher-cost and less environmentally-compatible construction materials. The combined earth/bamboo structure allows two-level buildings which reduces land use. The low-tech but sophisticated approach creates the potential to develop a unique local architecture, and transfer the approach to many other regions, particularly in less-developed countries.
Urban agriculture and factory conversion  
Bangkok, Thailand
Located in a mixed use urban zone in central Bangkok, the *Urban Farm Urban Barn* aims to return green areas to the booming city. A former textile factory and abandoned farmland on an adjacent block shall be transformed into a 1.4 ha agricultural production site and retail outlet. The atrophying rural economy is reactivated in the context of modern urbanity, and elaborated in a remarkable way. The factory building is converted into an eco-supermarket, additional buildings, such as a restaurant and marketplace are integrated into the crop production by becoming agricultural structures themselves. Crops and their sequences are carefully selected and balanced, aiming to maximize harvest without exploiting the resources, while providing a habitat for local fauna. In a larger context, this concept aims to counterbalance the ongoing spatial separation of food production and consumption. A number of such units are intended to be established in the metropolitan area, reintroducing elements of self-sufficiency and reconnecting food production and consumption.

**Comment of the Holcim Awards jury Asia Pacific**

The jury commended this project for demonstrating an innovative way to respond to the detrimental consequences of urbanization in a rapidly-growing metropolis. Industrial wasteland, usually scarring the urban fabric, is re-cultivated and moreover becomes a local point of attraction, providing a number of social and ecological benefits. This scheme has the potential to create a new urban culture, re-sensitizing the community to its ecological impacts, and offering a new perception of urbanity that is readily transferable. Since the project is commercially driven, it has a strong potential to be realized and will act as a test laboratory for this new kind of organizational structure – illustrating its capacity for economic performance and compatibility.
Ecologically-designed retail and commercial building

Putrajaya, Malaysia

This project automatically qualified as a Finalist in the Global competition 2012. See page 98.
The 14-level commercial and retail building is located on the main boulevard of Malaysia’s planned city and federal administrative center, Putrajaya, 25 km south of the capital, Kuala Lumpur. The building concept is based on a sophisticated, well-elaborated and integrative merger of eco-friendly state-of-the-art technologies appropriate for high quality use. The two towers are interconnected by a public atrium and pedestrian bridge, and with the shaping of the building masses producing a well-formulated urban space with an inviting atmosphere. Vegetation is actively integrated to reduce energy consumption, provide solar shading, and create comfortable spaces considering all requirements of utilization. A double-skin façade system assimilates a number of functions acting as a ventilated air cavity, improving thermal performance and featuring traditional Malay design patterns – while also creating a unique aesthetic element in the newly-created urban space. Active water management collects and treats surface runoff water via bioswales and is stored on-site for irrigation. The lighting concept balances economic demands of the urban surrounding with the aim to minimize energy consumption by introducing grading modes that become a beneficial aesthetic soft design element.

Project authors: Kenneth Yeang (pictured) and Tengku Robert Hamzah, T. R. Hamzah & Yeang International, Malaysia.

Comment of the Holcim Awards jury Asia Pacific

The jury considered this project an imaginative and leading-edge response to upmarket building design. The well balanced, detailed and pinpointed combination of high-tech elements with the functional integration of vegetation demonstrates a complex holistic approach to creating a high-class living space that is responsive to the local climate. The sustainable building services contribute to the concept in an exemplary way. The whole building vibrantly visualizes its environmental issues, is partially open to the public and is socially engaged with its surroundings. The integrative engineering approach leads to a sustainable building organism and is a commendable example of best practice design processes.
Community structure to encourage social cohesion and development

Cepogo, Ngargorejo and Bongkok villages, Indonesia
The primary focus of this group of initiatives is on construction as a vehicle for education and consolidation of a community using an architectural project rather than on the realization of a specific building. The process of building a structure is used to enhance a traditional form of Indonesian social cohesion—whereby defining diverse aspects of the project and reaching solutions to problems are integral parts of the approach to enable the people to achieve objectives defined by the group. The project demonstrates to the communities of three villages, in the districts of Boyolali and Sumedang in Java, a number of processes and strategies in addition to the beneficial use of local materials. By focusing upon enhancing social cohesion, the project further develops the existing skills of community members and also introduces new knowledge. This process enhances both practical skills and reinforces a sense of community. Furthermore, the completed building itself serves as a place of gathering and social exchange.

Comment of the Holcim Awards jury Asia Pacific
The jury recognizes this project due to its focus on the educational dimension of the realization of a building. A well-elaborated pedagogic concept introduces the idea of a low-tech but detailed design project that serves as an impetus for community building. The orchestrated and moderated process becomes more and more independent and empowers the local community.
Post-earthquake housing renovation

Kobe, Japan
The aftermath of the 1995 Kobe earthquake is still visible in the city, which left more than 6,000 casualties and caused USD 100 billion in damage. More than fifteen years later, a number of buildings that were constructed quickly after the incident now require extensive renovation. The aim of this project is to upgrade an existing concrete structure using simple means. In five steps, the interior and immediate surroundings of the building shall be improved. The starting point is a series of interior works which convert the ground floor into a retail facility. The last step consists of outdoor gardens and extensively vegetated exterior structures forming an ameliorated urban space. In addition structural components fabricated from recycled timber are blended with the previous building elements.

Project authors: Masaaki Takeuchi, uzulab, Japan and Shihoko Koike, Osaka City University, Japan.

Comment of the Holcim Awards jury Asia Pacific
The jury acknowledges the well-detailed concept that makes use of extremely simple devices. The original concrete structure is transformed into differentiated space. The exterior creates garden spaces and a new level of aesthetic quality which was previously lacking. The combination of inside and outside – both from interior and exterior and from exterior to public space – is a determining element of the project’s concept. Through this connection, the structure becomes a positive symbol of community. The use of recycled timber components is exemplary.
Primary healthcare center near Dharmapuri, India
This project is located in a rural area, 20 km west of the town of Dharmapuri, in the state of Tamil Nadu which forms the southernmost part of the Indian peninsula. With a low budget, the project shall serve to improve healthcare in this hot and semi-arid rural region. The compact and small-scale building distinguishes between a high-tech medical core and a low-tech surrounding layer. The latter serves as a shaded and well-ventilated waiting and gathering space. A team of specialists and local craftsmen that will benefit from professional exchange undertake the structural work – the first to erect the inner core, the latter to build the envelope. Strong focus is laid on the efficacy of simple and local materials, whose characteristics are well-considered in their specific application. The roof consists of recycled Tetra Pak containers, base walls are made of rubble stones, and shade screens are manufactured using a local variety of vetiver grass which is moistened to create an evaporative cooling effect during the severe dry tropical summer. Rainwater is collected and used for water-efficient irrigation. The climatic concept incorporates the vegetation surrounding the building where plantings contribute to the cooling of the building and control glare and dust.

Comment of the Holcim Awards jury Asia Pacific
The jury recognizes the strength of the project in its sophisticated detailing. Materials are employed respecting their specific qualities. Altogether this forms a simple and elegant design. This is continued in the natural simplicity of providing gathering spaces that will be utilized for providing health awareness programs to the local community. This small-scale edifice is an outstanding example for comparable building tasks.

Project authors:
Iype Venperampil (left) and Rajesh Renganathan, Flying Elephant Studio, India.
Socially-integrated rural school  Sukoharjo, Indonesia
A fundamental element of this school project, Sekolah Alam Baki child-friendly learning located in central Java, is its pedagogic concept that strongly respects children’s rights. A focus is laid on imbuing all elements of the school program with the theme of respect for nature, such as through the teaching of sustainable farming methods and the principles of hydroponics. On a socio-economic level, the school is integrated within the local fabric and enables an on-site market involving the local community who also share in the educational benefits. The layout of the school complex reflects the holistic theoretical background. Immediate school functions, agricultural areas and market places are integrated with high density on the site. The buildings are fabricated mainly from local materials and the efficient footprint area of the design appropriates less than 5% of the site area, thus maximizing the site availability for organic farming. Vegetation, integrated into façades and acting as an educational tool, contributes to shading and is combined with natural ventilation. The water concept includes rainwater collection and storage supplemented by the use of up to 85% of the site’s grey water.

Comment of the Holcim Awards jury Asia Pacific
The jury commended this project because of its visionary rethinking of merging density with simplicity. This balancing act is not only well-resolved on a structural level but also on a contextual level. Urbanity, meaning its positive intellectual attributes, is transferred to the countryside and merged with the rural “genius loci” (inherent spirit of place). Well-composed spacing underlines this idea. The selection of materials including concrete, bamboo and reclaimed wood; and well-elaborated design of the buildings go hand in hand with the school’s pedagogic framework. The essences of its integral elements make this project exemplary.
Urban renewal and transport circuit

New Delhi, India
In the mid-1970s, a ring railway was established for long-distance freight, circumscribing the extent of New Delhi at the time. Further extension of the passenger rail service commenced in 1982 but was not integrated with other transit systems and has therefore been underutilized. Due to the growth of the city, the rail corridor now lies within the urban zone. The Changing Tracks: Re-imagining the Delhi Ring Rail project converts this spatial resource from a restricted mono-use barrier into a multi-use civic and traffic space within the urban fabric. The concept provides space for informal street vending that is increasingly marginalized by the sprawling motorized traffic network and adaptively reuses existing structures including platforms and stations. The redefined space dedicated to pedestrian and bicycle traffic slows down transit speed and brings together street vendors and clients and supports the vibrant street life which is an integral part of Indian culture. This is strengthened by an IT concept providing an information cloud that allows exchange among participants and recreates the tradition of word-of-mouth communication in a modern context.

Comment of the Holcim Awards jury Asia Pacific
The jury acknowledges this project due to its beneficial approach on several levels. Technically, it contributes to attenuate pressing traffic problems by offering space for alternative modes of transportation. Socially, it encourages the establishment of cooperatives, which improve the conditions of people within the informal sector. On the urban level it creates spaces of high amenity value. These essences are widely transferable and the exemplary information cloud component completes the overall sustainable concept.

Project authors:
Madhav Raman (left) and Vaibhav Dimri, Anagram Architects, India.
Vertical informal settlement and waste recycling center

Jakarta, Indonesia
This housing strategy in Jakarta aims to offer an alternative semi-organized structure, addressing people otherwise living in informal settlements that continuously face severe flooding. At the same time the project promotes waste recycling and thereby helps address a major problem and cause of flooding in Indonesia’s capital of ten million inhabitants, where the congested canal system is jammed with waste. In contrast to former housing projects, Jakarta Bersih focuses on the satisfaction of basic requirements of low-income settlements. The social coherence is maintained and affordable living space is offered by providing only a raw structure featuring basic electric and sanitary supply. As occurs in informal settlements, the inhabitants furnish the shelters on their own in an incremental way. The multi-layer or vertical alignment of the structure reduces land consumption, releasing central areas for open space use including fishing ponds, agriculture and parks. The community-based and integrated recycling facility serves several functions: it reduces general waste load, processing generates income for the inhabitants as well as material for their shelters, and the processing of bio-waste produces biogas which becomes an energy source for local electricity production.

Comment of the Holcim Awards jury Asia Pacific
The jury acknowledges the project as an innovative approach to turn problems that many cities in the world are facing into opportunities that all parties benefit from. It does not deny migration of the poor but addresses the situation in a proactive manner that accepts its specific dynamics. The semi-organized structures provide a necessary framework that safeguards basic human requirements but leaves that flexibility, which is essential for economic migrants. In addition it also offers a resource stream upon which the inhabitants depend.
Bicycle use for commuting revitalization project
Like many rapidly-growing cities with a prospering society, Beijing faces significant problems caused by rapid growth in private automobile traffic — and a further 1,800 cars are added to the city's streets every day. The Auto-Mobile Beijing project aims to re-establish a bicycle culture in the former "bicycle kingdom" providing the potential to be a model for other cities with similar conditions. On the theoretical level the project aspires to create a trendsetting new bicycle avant-garde by incorporating lifestyle components with a practical mode of transportation which makes bicycle use a desirable alternative. A parallel and independent bicycle infrastructure is planned under existing flyovers, reclaiming current wasteland in interstices of inner-city highway intersections to establish structures offering tailored functions addressing the new bicycle avant-garde. The enclosed bicycle network is placed adjacent to heavily-congested traffic routes that emphasize the effectiveness of the alternative transport mode. Cladding components recycle car metal panels and front screens, and incorporate photovoltaic panels and micro turbines to generate energy from the wind suction of passing cars.

Comment of the Holcim Awards jury Asia Pacific
The jury is convinced by this remarkable project due to its visionary and strategic approach. It advocates bicycling as a powerful alternative for urban transit and recalls its well proven potential in the world's former bicycling capital. The visionary idea is shown to integrate pollution reduction and energy saving solutions into existing structures while addressing the urgency of implementing different approaches to urban transit – here and in other cities of the world. Moreover it demonstrates how residual central spaces may be occupied with beneficial and sophisticated design solutions in function, embedded systems and aesthetics that are well integrated. This "out-of-the-box" thinking sends a message to all developing metropolitan areas and provokes a process of rethinking by contemporary urban planners.

Project author: August Liau, Massachusetts Institute of Technology, Cambridge, USA.
Town plan revitalization and urban development

Navi Mumbai, India
This project targets the further development of Ulwe, a precinct of world’s largest planned city of Navi Mumbai. The modernist master plan was developed in the 1970s and revised according to aspirations for a globalized urban development in the 1990s. Present settlements are monotonous and lack identity. The Village, the City, and the Ecosystem reconsiders the past development of the region that led to a rapid transformation of the area with little consideration of the existing landscape. The revised approach acts within the larger urban framework, but concentrates on an area in a more manageable scale. Existing village settlements are integrated instead of being erased, affiliated agricultural areas shall be maintained. Landscaping becomes an integral part of the urban design – including carefully-formed monsoon channels that anchor the urban development, create a strong identity, and offer valuable recreational spaces. The functional mixture is intensified, promoting urban vitality. The provision of a centralized precinct for India’s film industry is a major component for establishing the local economy and generates employment in a large variety of qualifications hence allowing a social mixture among native and new residents.

Comment of the Holcim Awards jury Asia Pacific

The jury commended this project for its seminal approach to town planning that introduces focus and context-sensitivity into large scale urban planning. It is a showcase of a conceptual framework for city expansion, applicable where classic urban planning failed. Demands of the city, an ecological concept, and issues of existing communities are respected and addressed. They are treated as integral parts of the city expansion. This urban development provides space for contemporary culture and sets correlation with traditional culture. A “high density” ecosystem negotiates between the urban and the rural. In the area of conflict between technical, social and political necessities, this project has the potential to trigger a revision of past urban planning and its redeployment in terms of today’s and future challenges.
Decentralized sanitation system near New Delhi, India
In underdeveloped settlements, a lack of sanitation is one of the major problems. By applying an additive strategy, this project aims to significantly improve hygiene and strengthen social cohesion within the local community by involving the residents throughout the process. Savda Gehra, a regulated resettlement suburb 30km west of New Delhi, serves as a model. The area is characterized by incremental housing ranging from one-story shelters to consolidated simple two-level constructions including a roof terrace constructions that reflect the economic capacities of their inhabitants. The use of community toilets that is forced by municipal regulations has proven impractical, so inhabitants defecate in the open as they can rarely afford costly individual toilets with septic tanks. The project strategy acts from two sides: intense on-the-ground research identified inhabitants’ needs and expectations; and top-down, the municipal authorities were involved and urged to reconsider regulations that would be more practicable in poor neighborhoods. The outcome is a community cluster based sanitation system that is additively applicable by installing simple elements such as rainwater collectors; individual basic toilet bowls and shared black water collection.

Comment of the Holcim Awards jury Asia Pacific
The jury awarded this project due to its sound research approach that leads to a practical solution for an urgent problem. The installation of a sound and reliable sanitation system counters immediate problems and the direct design integrates successfully. The realization is a convincing demonstration of a best practice process, leading to a simple, cost-effective solution. Its pedagogic approach provides knowledge and promotes common acting of individuals leading to a consolidated sense of community, beneficial to all. The project sets a moving signal for the future of sharing responsibilities – here and elsewhere.
Global Holcim Innovation prize jury

Zurich, Switzerland, March 19, 2012

1 Hans-Rudolf Schalcher, civil engineer, Switzerland
2 Vanderley John, civil engineer, Brazil
3 Stuart Smith, structural engineer, United Kingdom
4 Harry Gugger, architect, Switzerland (Head of the jury)
5 Bernard Fontana, engineer, France/Switzerland
6 Sujit Ghosh, civil engineer, Singapore
7 Roland Köhler, economist, Switzerland
8 Markus Akermann, economist, Switzerland

All 53 prize-winning projects in the regional Holcim Awards competitions 2011 (including Acknowledgement and “Next Generation” winners) competed for the Global Holcim Innovation prizes. This newly-created recognition focuses upon contributions to innovative building materials and construction technologies in the context of sustainable construction.
“The Innovation prize recognizes research in sustainable construction and is an important source of motivation.”

Harry Gugger, Head Global Holcim Innovation prize jury 2012
“Potential for revolutionising the construction process”

Appraisal of “High-efficiency concrete formwork technology, Zurich, Switzerland” by the Global Holcim Innovation prize jury

In the regional phase of the 3rd Holcim Awards competitions, this project was awarded an Acknowledgement prize in Europe. See page 116/117.
The jury commended the project for its excellent level of research and practice-oriented experimentation. The proposed concrete production process developed by a research team at the Professorship for Architecture & Digital Fabrication at the Swiss Federal Institute of Technology (ETH Zurich) is an ingenious approach to casting concrete surfaces of highly complex geometrical definition. It advances an entirely new sequence of production phases. First, a robot actuates a flexible molding surface to form a positive of the later to be cast concrete shape. Then, liquid wax is poured onto the actuated surface. Once cooled, the wax negative form becomes one element of the actual on-site formwork, into which concrete is poured to finally produce the desired element. After the process is completed, the wax negative form can be heated and made liquid, in order to be reused for the next formwork pouring process.

The outstanding merits of this innovative concrete production method are fourfold: First, it eliminates the need to use expensive and marginally-recyclable construction materials such as EPS, wood or steel sheet, while replacing the traditional materials for concrete formwork by wax. At the same time, it reduces formwork-related construction waste almost to zero. Second, it considerably cuts down the tremendous volume of manual labour necessary to produce highly complex concrete formwork inlays because a fully automated robotic process is established. Third, the relatively low cost of this formwork technology is a prerequisite for the economical production of geometrically complex one-off, on-site concrete structures. Fourth, there are virtually no limits regarding the curvature of concrete structures with a hitherto unimaginable degree of accuracy. Overall, this visionary formwork technology for geometrically complex concrete elements is a real quantum leap combining the utmost computer-aided manufacture (CAM) technologies with the latest generation of robots that has the potential for revolutionising the construction process thereby enhancing sustainability.
“A new trajectory for the use of concrete”

Appraisal of “Low-cost apartments incorporating smart materials, Hamburg, Germany” by the Global Holcim Innovation prize jury

The design scheme addresses the future of the city of Hamburg as a high-performing and attractive 21st century metropolis. The brief for the Smart Material House required proposals for innovative building techniques and materials for a public housing project in a less developed neighborhood. The units range in size between from 90 to 225 m² and incorporate fast-growth fir decking slabs with pre-fabricated infra-lightweight concrete walls. The lightweight concrete is one-third of the weight of conventional concrete, is self-insulated utilizing recycled foamed glass as an internal aggregate and allows the building to approach a zero-carbon material effect. The walls are embedded with tube conduits to provide conductive heating and cooling via water, triple-glazing improves sound and heat insulation, and the roof is planted with local vegetation.

All prize winning projects in the regional Holcim Awards competitions 2011 automatically qualified for the Global Holcim Innovation prize competition 2012. This project was awarded the 2nd prize. Read the appraisal of the jury from page 218.

Project authors: Mike Schlaich, Technische Universität Berlin, Institut für Bauingenieurwesen, Germany (left); Frank Barkow, Barkow Leibinger Architects, Germany. Not pictured: Regine Leibinger, Barkow Leibinger Architects and Technische Universität Berlin, Institut für Architektur, Germany; Matthias Schuler, Transsolar Energietechnik, Germany.

Comment of the Holcim Awards jury Europe
The jury identified the strength of the project in its innovative concept for construction and material that uses pre-fabricated lightweight-concrete elements which incorporate recycled foamed glass as an internal aggregate. On top of that is an overall design scheme with competent solutions for a public housing development in every relevant aspect – an ambitious design and a zero-carbon energy concept even in the context of lower-income communities.
The project led by Barkow Leibinger Architects for low-cost apartments incorporating smart materials in Hamburg, Germany, is an outstanding achievement in terms of concrete technology, typology, and energy efficiency in the context of affordable housing. Firstly, the concrete technology makes it possible to cast wall elements with particular shapes in a prefabricated panel system. The design can be created with only two different wall prototypes, and yet achieves a surprising variability in the plastic expression of the walls. Depending on the orientation of the elements, the system can generate an astonishing array of variable ground plans. Since the walls only take vertical loads (horizontal loads are taken up by the central core), the system accommodates a high flexibility in the spatial organization of the ground plans.

The concrete walls themselves are 50 cm thick. The concrete is mixed with an aggregate of recycled glass, which reduces its density to less than 800 kg/m³. The weight is further reduced by using glass fibre by using glass fibre instead of steel for reinforcement. Snake-like tubes inserted in the outer portion of the concrete serve as solar collectors. Thanks to these measures, the concrete is thermally self-insulating, and does not require insulating materials to be applied to the exterior – its bare-faced concrete again, like in the heyday of modernism, but this time environmentally sound.

In a time where concrete can virtually not be used without thermal insulation applied on top of it, this integration of structural and climatic properties within the performance of concrete opens a new trajectory for the use of concrete in contemporary building. The floor slabs are made of laminated timber, for its lightness, ease of assembly, and favourable acoustic insulation properties. The jury agreed that with its ambitious formal and structural agenda, the project re-frames the perception of social housing. It shows that tight budgets for social housing do not have to lead to architecture of formal repetition. The project shows the potential of experimentation especially in social housing. It produces a recognizable identity, a memorable expression – qualities hitherto more willingly associated with architecture heightened by a larger budget. Claiming architecture of formal and material idiosyncrasy for a social housing project, the authors demonstrate how public housing can escape its historical clichés and start to explore an entirely new territory of potential.
Global Holcim Innovation 3rd prize 2012

“Vision of concrete fabrication without conventional moulds”

Appraisal of “Efficient fabrication system for geometrically complex building elements, London, UK” by the Global Holcim Innovation prize jury

In the regional phase of the 3rd Holcim Awards competitions, this project was awarded the “Next Generation” 1st prize in Europe. See page 122.

Povillas Cepaitis, Diego Ordoñez, Lluis Enrique and Carlos Piles.
This project received the special interest of the jury for a variety of reasons. Students of the Architectural Association in London presented an approach to a fundamental problem of contemporary architecture: while the design of complex geometric shapes has become increasingly easier, it is their construction that is the tricky bit. With its plasticity and flexible moulding, concrete is actually a material that lends itself well to a sculptural language. However, as the production of the necessary formwork is typically made by hand, the cost of building often exceeds regular budgets. It was the consensus of the jury that this project opens new productive opportunities to overcome this dilemma. Its essential proposal is to produce modular elements of concrete and use one element, once cast, as formwork for the next element to be cast.

Even if the project does not indicate how the upper surface of the element would be cast and also ignoring the fact that to cast the very first element, there has to be some kind of formwork, the project holds the vision of concrete fabrication without conventional moulds. A prospect which would doubtlessly make a big difference in terms of the material processing of building, given that so much formwork is disposed after use. In addition, the elements cast through this process would be easily transportable; their self-similar form allowing for space-saving stacking. Despite some unsolved problems, the project does present a fresh new perspective on the production of concrete that has the capacity to accommodate some of the formal interests of contemporary architecture—an achievement for which the jury considered this project of the “Next Generation” category deserves commendation.
Expressing the golden ratio

The trophies of the Global Holcim Awards competition including the Innovation prize (far right) are derived from the icosahedron, a geometric solid that displays the proportions of the golden ratio.

Tetrahedron

Hexahedron
“Numbers are the essence and principal of all things,” stated Greek mathematician and philosopher Pythagoras of Samos over 2,500 years ago. From this belief followed theories of mathematical proportions – and the model of the golden ratio, considered the ideal proportion, “the noblest and most irrational of all numbers.”

In the golden ratio, also known as the golden mean or golden section, a length is divided such that the proportion between the two segments is equal to the proportion between the longer segment and the total length: \( a:b = (a+b):a \). The ratio of \( a \) to \( b \) is approximately 1.618 to 1 – usually denoted by the Greek letter \( \Phi \) (phi).

The icosahedron is the most complex of the five platonic solids. The faces of these solids are regular polygons, arranged congruently to each other. An equal number of these polygons intersect at every corner – the solids are therefore fully symmetrical. From the icosahedron a figure can be derived whose elements display the proportions of the golden ratio. This figure was chosen for the Holcim Awards.

To form the symbol of the Holcim Awards, three pairs of opposing edges from among the many edges of the icosahedron are selected so that these pairs define three congruent rectangles. This forms a sort of “skeleton” of the icosahedron. The sides of these three rectangles correspond to the golden ratio: they are sides (or diagonals) of regular pentagons that relate to each other in the golden ratio.

The balanced proportionality of the golden ratio symbolizes the objectives of sustainable construction, which always strives for a harmonious balance between today and tomorrow, between resources and consumption, between needs and opportunities. No figure represents the golden ratio as ideally as the “reduced” icosahedron – the symbol of the Holcim Awards which is presented to the main winners of the regional and global Holcim Awards competitions in recognition of their projects.
Assessing sustainability

“Target issues” for sustainable construction
Sustainability is one of the world’s most talked about but least understood words. To make the criteria of sustainable construction concise and transparent, the Holcim Foundation and its renowned partner universities have defined five so-called “target issues”. They consider sustainability from a holistic perspective. The independent juries of the Holcim Awards use these criteria to evaluate the competition entries.

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<tr>
<th>Progress</th>
<th>Innovation and transferability</th>
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<td></td>
<td>The project must demonstrate innovation at the forefront of sustainable construction. Breakthroughs and trend-setting approaches, irrespective of scale, must be transferable to a range of other applications.</td>
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<th>People</th>
<th>Ethical standards and social equity</th>
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<td>The project must adhere to the highest ethical standards and support social equity at all stages of construction, from planning and building processes to long-term impact on the fabric of that community. The project has to provide an advanced response in terms of ethical and social responsibility.</td>
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<th>Planet</th>
<th>Environmental quality and resource efficiency</th>
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<td>The project must exhibit a sensible use and management of natural resources throughout its life cycle, including operation and maintenance. Long-term environmental concerns, whether pertaining to flows of material or energy, should be an integral part of the built structure.</td>
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<th>Prosperity</th>
<th>Economic performance and compatibility</th>
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<td>The project must prove to be economically feasible and innovative as far as the deployment of financial resources is concerned. Funding must promote an economy of means and be compatible with the demands and constraints encountered throughout the construction’s life span.</td>
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<th>Proficiency</th>
<th>Contextual and aesthetic impact</th>
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<td>The project must convey a high standard of architectural quality in the way it addresses cultural and physical factors. With space and form of utmost significance, the construction must have a lasting aesthetic impact on its surrounding environment.</td>
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Living up to the “target issues” for sustainable construction (facing page): the cement production facilities of Holcim Apasco in the Sonora desert in Mexico set new standards for safety design, thermal efficiency, water efficiency, and environmental stewardship.
The fourth international Holcim Awards competitions open at www.holcimawards.org on July 1, 2013.
Holcim Awards for Sustainable Construction
Editor: Edward Schwarz, Holcim Foundation, Zurich, Switzerland

Text: Marius Leutenegger, derexter, Zurich, Switzerland

Winner essays (pages 8-103)

Project descriptions (pages 108-213) Courtesy of the respective project author(s)

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Winner portraits and Awards ceremonies

Project and model photos, plans and sketches Courtesy of the respective project author(s)

Additional photographers:
Erik Brühlmann, Zurich, Switzerland (pages 81, 82)
Diego Brito, São Paulo, Brazil (pages 16, 18)
Alain Bucher, Bern, Switzerland (pages 4-7, 214, 215, 224)
William Chua, Singapore (pages 99, 195)
Donovan Kirkwood, Cape Town, South Africa (page 181)
Miguel de Guzmán, Madrid, Spain (pages 32, 34, 36, 37, 111)
[phase eins], Berlin, Germany (page 106)

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